January 5, 1956

The IRON AGE

A Chilton Publication

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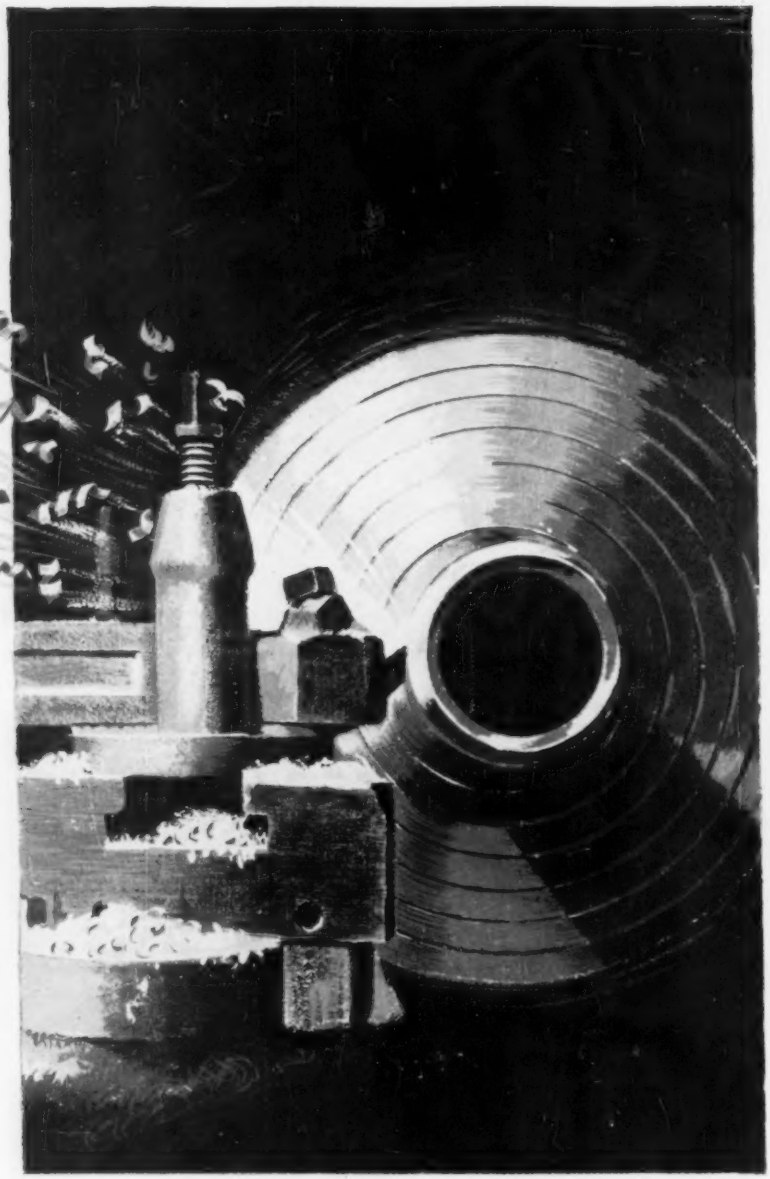
The Steel with "Built-in Productivity"



If your problem is to produce quality work at highly competitive prices—

If steadily rising operating costs make your problem almost impossible—

TRY LEDLOY*

the Steel with "Built-in Productivity"

Copperweld Aristoloy Leaded Steel gives freer machining, faster feeds and speeds and longer tool life.

The use of Ledloy often eliminates final machining because it cuts clean for finer finish.

For proof of increased production at lower cost, try a partial run with Aristoloy Leaded Steel.

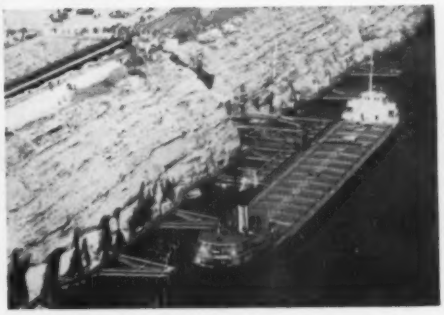
*Inland Ledloy License

ARISTOLOY STEELS

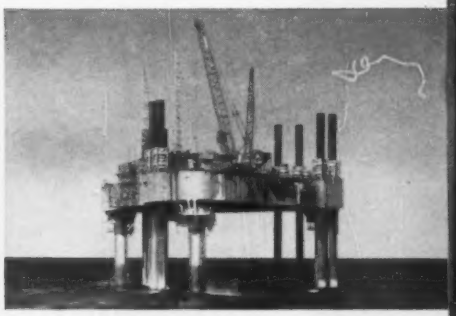
COPPERWELD STEEL COMPANY • Steel Division • WARREN, OHIO

Some 1955 Highlights of Bethlehem Steel

NEW YORK COLISEUM. During the year Bethlehem fabricated and erected 13,000 tons of steel and supplied 4000 tons of reinforcing bars for this project. In addition to the huge exposition hall with space as large as nine football fields and seating capacity for 10,000 persons, the Coliseum includes a 20-story office building.

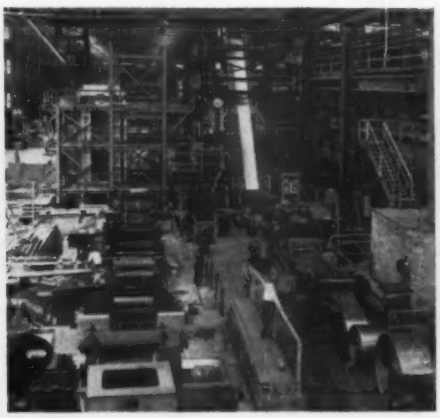


MARMORA ORE. The first shipload of pelletized iron ore from Bethlehem Steel's new Marmora, Ontario, mine left for Lackawanna plant on May 11, 1955. This shipment followed nearly five years of exploration, construction and stripping activities at Marmora. It is expected that by the time full production has been reached, 1400 tons of iron ore pellets will be shipped each day.



SENTINEL AT SEA. 110 miles east of Cape Cod in the open ocean stands the first steel "Texas Tower," a radar island which will flash warnings to the mainland in case of air attack. Built at Bethlehem's Quincy shipyard and fitted out at East Boston yard, the island of steel (shown during installation) was towed by powerful tugs to its permanent location at sea.

FLAT CARS FOR TRAILER TRUCKS. Two hundred special flat cars were built for the Pennsylvania Railroad's new "TrucTrain" service. Trailer trucks load at the shipper's doorstep, ride one of these cars to a terminal near destination, debark and deliver to the consignee's door. Bethlehem also built 50 cars for a similar service on the Erie Railroad.



NEW FACILITIES. Among the new facilities under construction during 1955 were a 48-in. cold-reducing mill and additional equipment for the production of galvanized strip and tinplate at Sparrows Point plant, together with a new electric-weld pipe mill, and a new 160-in. sheared-plate mill. Various other facilities to expand capacity and improve production were added at other Bethlehem plants.

STEEL FOR FLOOD REPAIR. Soon after Hurricane Diane's disastrous flooding of vast areas in the Northeast, Bethlehem began making emergency shipments of steel. Thousands of tons of shapes, piling, reinforcing bars, and rails were rolled and rushed to stricken areas. Much of this steel came from the Bethlehem, Pa., plant, itself damaged by the flood.

SAFETY IN STEELMAKING. For the sixth consecutive year, the Bethlehem, Pa., plant won first place among large steel plants in the National Safety Council's contest. During the contest period the accident rate among the plant's 20,000 employees was so low that an employee's chance of injury in a normal eight-hour working day was only one in 237,000.

NEW FABRICATING WORKS. The construction industry in Southern California is now being served by Bethlehem Pacific's new fabricating works, completed in mid-1955 at Torrance, Calif., near Los Angeles. With three acres under roof, the new Torrance Works is the largest of Bethlehem Pacific's four fabricating works, with facilities for riveted, welded and bolted types of fabricated steel construction.

STEEL FOR ST. LAWRENCE POWER. More than 16,000 tons of Bethlehem steel sheet-piling were supplied during 1955 to the vast St. Lawrence River power project. The piling was used in cellular cofferdams at two locations, Long Sault (above) and Barnhart Island.

BETHLEHEM STEEL

January 5, 1956 — Vol. 177, No. 1

The IRON AGE

101ST ANNUAL

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REVIEW-FORECAST

BUSINESS LOOKS FOR ANOTHER BRISK YEAR —P. 136

Most signs point to another fine year for the whole economy. Steel, machine tool, aircraft backlogs assure high production levels well into the year. Auto production, government spending and construction will continue at sizzling pace. A serious slump is out.

YOU'LL LACK SOME MATERIALS, PAY MORE —P. 140

Steel and aluminum industries will boost capacity this year. But there's no immediate prospect of eased supply. Too many metalworking consumers go into the year crying for more of everything. Prices of most basic materials will go up.

GET SET FOR AN ALL-OUT LABOR DRIVE —P. 144

Unions will drive hard for higher wages and more fringe benefits. Supplementary unemployment payments will be a big issue. Organized labor will step up political activity, push for favorable laws and men.

KEEP AN EYE ON NUCLEAR POWER —P. 148

Commercial activity in the atomic field was stepped up in 1955. Nuclear power as a large-scale, paying thing is still years away, but the next 12 months will see important strides by private nuclear interests.

DON'T COUNT ON GOVERNMENT TOO MUCH —P. 152

Defense spending will continue at high rate. Fast tax write-off will lie dormant for some time. But don't look for union curbs or cuts in corporate income taxes. Election year thinking will govern Washington for next 8 months.

REVIEW — FORECAST ISSUE

YOUR OLD TOOLS MAY PROVE COSTLY —P. 195

Machine tool builders look forward to a good year. They come into 1956 with backlogs averaging six months and they see Detroit coming in with major retooling orders. More important, there is a growing awareness that outmoded machines can be a competitive liability.

REVIEW FORECAST

MACHINING SPEEDS, ACCURACY STEPPED UP —P. 160

Spurred by giant Chicago machine tool exhibits, emphasis on improved equipment, techniques in '55 was strong. Development of even faster, more precise tools seems a cinch bet. Better machines, tooling, lubrication, techniques, plus ever-tightening tolerances, all point the way. The changing pattern in metalworking is one of continued growth on a broad front. Automation in itself is not a cure-all for higher output and lower costs.

CASTING QUALITY IS STILL IMPROVING —P. 164

Foundries and melt shops, making wider use of improved inspection equipment, modern methods, are constantly meeting tighter quality specs. Shell-molding advances, better melting practice, die-casting progress, more efficient materials handling—all modified industry methods, contributed to casting progress in 1955.

FASTER PACE MARKS STAMPING, FORGING —P. 166

Higher press speeds, more mechanical handling of blanks and stamping, better clutches, improved die designs have contributed to greater production. Wider use of Kirksite and plastic short run dies by big-volume industries is noted. Development of a go-slow attitude toward full automation is underway.

MORE INTEGRATED HANDLING COMING —P. 170

Since materials handling in the metals field is conservatively estimated to account for 30 pct of finished cost, trend is toward more tailored continuous handling systems, from storage to shipping. Standard equipment components are favored to hold costs down. Long distance conveyer use widened. More compact equipment is in the offing.

SEE GROWTH IN AUTOMATIC PLATING —P. 175

Automation's no newcomer to the plating industry, but its progress—and potential — are staggering. Instrumentation plays an important role. Application of ultrasonics in the plating bath speeds plating up to 30 times normal rates. Improved efficiency is obtained in use of paints, plastisols.

SPECIAL FORECAST

CAN WE HIT $500 BILLION BY 1965 —P. 197

After a record prosperity year it's only natural that many businessmen feel uneasy about the future.

They feel that installment credit is too high; question if the automotive market can hold up; wonder if metalworking markets are really expanding or just being temporarily stimulated; and whether or not corporate debt threatens financial stability.

While these are logical questions, the editors believe it is possible to solve these problems and for the economy to move ahead to a gross national product of $500 billion compared to the present $360 billion.

THE OUTLOOK AS INDUSTRY SEES IT —P. 224

Best sources of information on 1955 developments and 1956 likelihoods for the metals areas are the industry's own associations. Accordingly, THE IRON AGE has asked, and here, summarizes, their opinions. Generally, they're optimistic.

FINDING THAT TRADE ASSOCIATION —P. 275

Here's a trade association directory to help you find organizations, addresses, names of the proper officers to contact, dates and places of 1956 meetings.

HERE ARE PRODUCTION, PRICE TRENDS —P. 285

This statistical section can be worth its weight in gold, is a helpful deskside companion for the year ahead. For general information, or specific facts, its hard to beat.

NEXT WEEK:

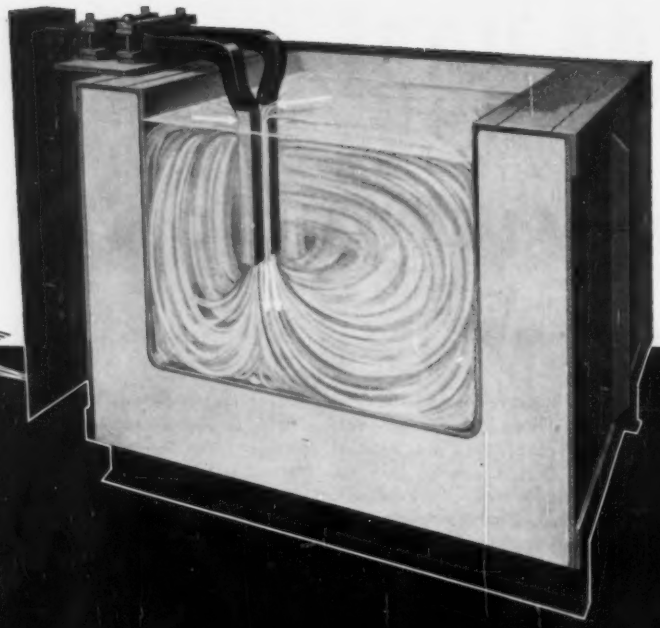
ARE YOU OVERPAYING YOUR ENGINEERS?

Company and government officials say we must have more engineers. Educators say situation will get worse. What are the facts? Are engineers really so scarce? Are they being used efficiently? Next week's report covers the nationwide picture; it tells how some companies lick the problem.

CERAMIC BRAZING JIGS RAISE OUTPUT

Ceramic jigs have helped cut costs, boost production in both small and large operations. They are remarkably stable thermally, permit assembly tolerances down to ± 0.0005 in. without jamming, buckling, warping. Brazing time with the jig has been cut 75 pct.

Suspended-electrode type furnace

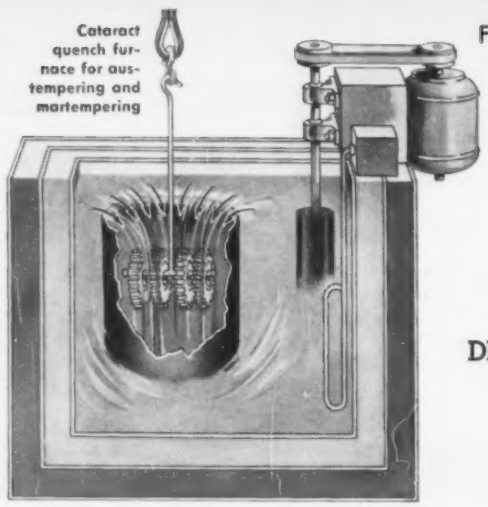


AJAX®

HULTGREN

Salt Bath Furnaces

Cataract quench furnace for austempering and martempering



For any of these applications . . .

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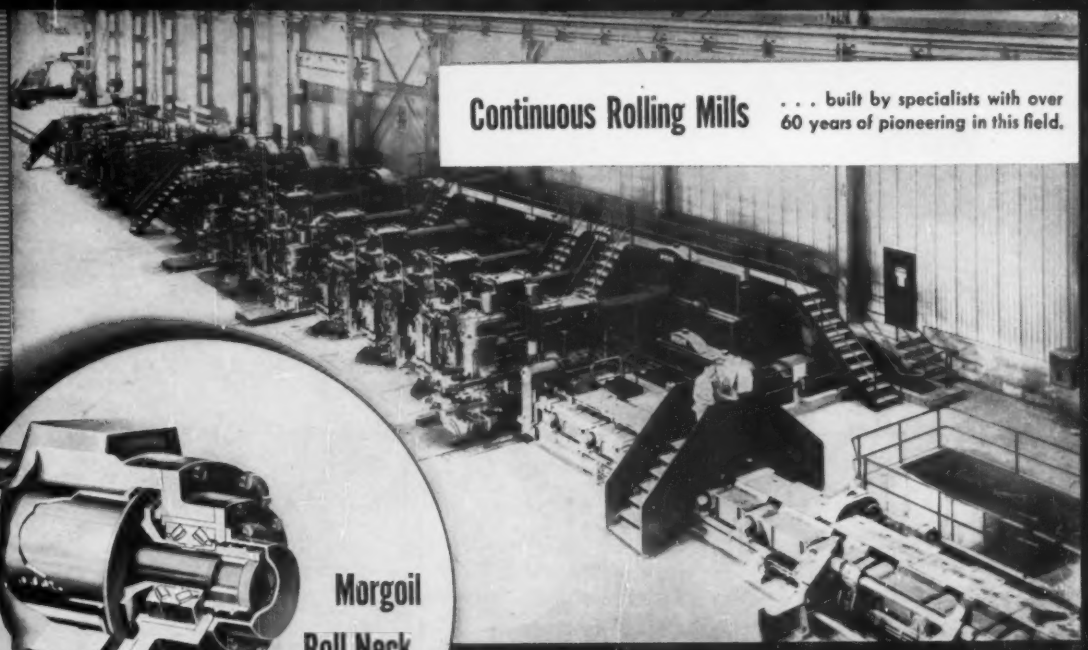
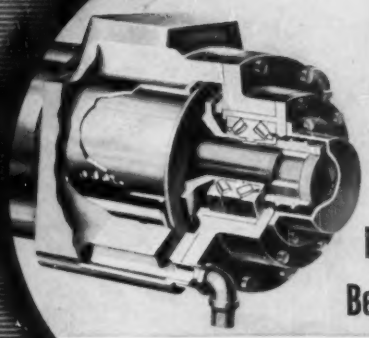


Continuous Rolling Mills . . . built by specialists with over 60 years of pioneering in this field.



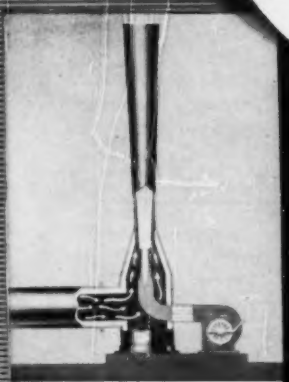
Morgoil Roll Neck Bearings

. . . will increase the accuracy of your product and save on operating and maintenance costs.

MORGAN WORCESTER

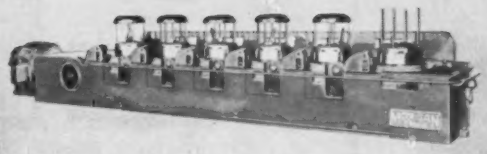
Can help you produce more and better steel products

G-2

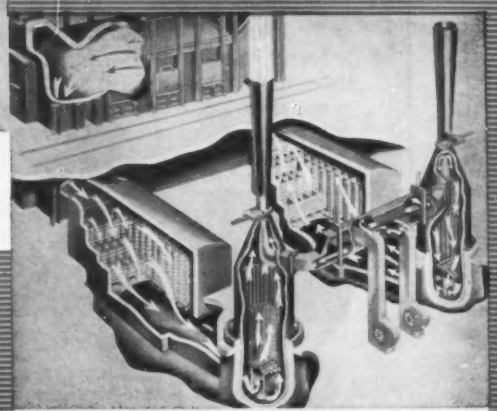


Morgan Ejectors

. . . efficiently handle hot gases and fumes as high as 3000° F.



Wire Machines . . . Morgan-Connors give high production, with low die cost, low power cost, low space requirement.



Furnace Control System

. . . Morgan-Isley increases efficiency of any regenerative furnace at relatively low installed cost.

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WORCESTER, MASSACHUSETTS

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English Representative
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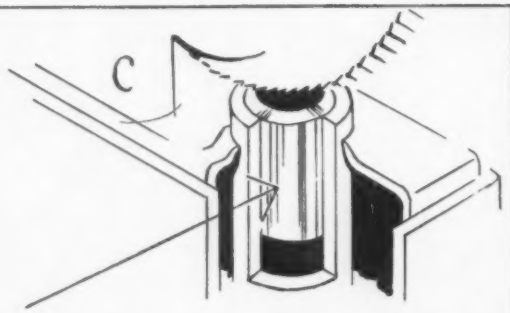
HOW ARMCO 17-7 PH STAINLESS STEEL

keeps this lighter in shape

A tiny hardened Armco 17-7 PH Stainless Steel bushing is the key to dependability and long service life of a well-known lighter.



WHAT THE STAINLESS BUSHING DOES

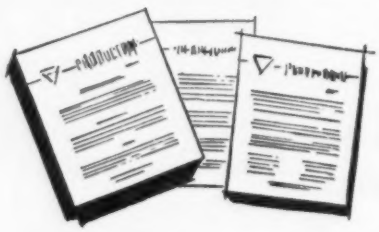
This collar in the top of the tube keeps the flint in alignment and prevents jamming. The collar must be perfectly formed and very hard. That's why it's made of Armco 17-7 PH Stainless Steel, precipitation hardened.

NO "FLOPOVER" FLINTS

In an ordinary flint tube, repeated pressure of the spark wheel against the flint causes the end of the tube to expand. This permits the flint to "flop over," making the lighter useless.

WHAT THIS STEEL OFFERS YOU

Consider the advantages of Armco 17-7 PH Stainless Steel for your products. It can be drawn and formed in the annealed condition to close tolerances. Then, it can be hardened at low temperatures to tensile strengths of around 200,000 psi. It is "transformed" by holding at 1400 F for 1½ hours and cooling to 60 F or below. Hardening is completed by heating to 950-1050 F, holding for ½ to 1½ hours and cooling.



GET COMPLETE DATA

Armco 17-7 PH is produced in sheets, strip, plates, bars and wire. Besides, there is a single heat treatment precipitation-hardening stainless steel, Armco 17-4 PH, made in bars, wire and billets only. For complete information on these special Armco Stainless Steels, just fill out the coupon and mail it to us.

ARMCO

ARMCO STEEL CORPORATION
1585 CURTIS STREET, MIDDLETOWN, OHIO

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ARMCO STEEL CORPORATION, 1585 Curtis Street, Middletown, Ohio

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

Don't Sell Your Company Short

◆ PEOPLE WILL TELL YOU this is your year of decision. You will be advised that the policies you draw up will mean success or failure for your company—or for yourself. It will be pointed out to you that world conditions are shaky; that the domestic political situation is far from serene; and that credit expansion among our people may ruin us.

Speaking directly to you: When have you ever had a year that was not fraught with hard decisions to make? When was it not a time when win, lose or draw was the "reward"? In what year were you not warned that politics would or would not play a decisive part in your company's affairs? And when in your career have world conditions ever been stable enough to disregard them as a factor in your company's future—or in your own?

Some of your business friends will get hysterical about the political outlook. Others may start pulling in their horns because of a remote memory of past disaster. There will be those who will play it "safe" and keep a good "liquid" condition.

If you overrate the advice of these friends of yours—who do not always DO as they say—you may be in for trouble. The big question for this year and the years to follow is no longer one of just playing it safe. You can play it safe while your competitor spends his head off; and carries off your share of the increased business.

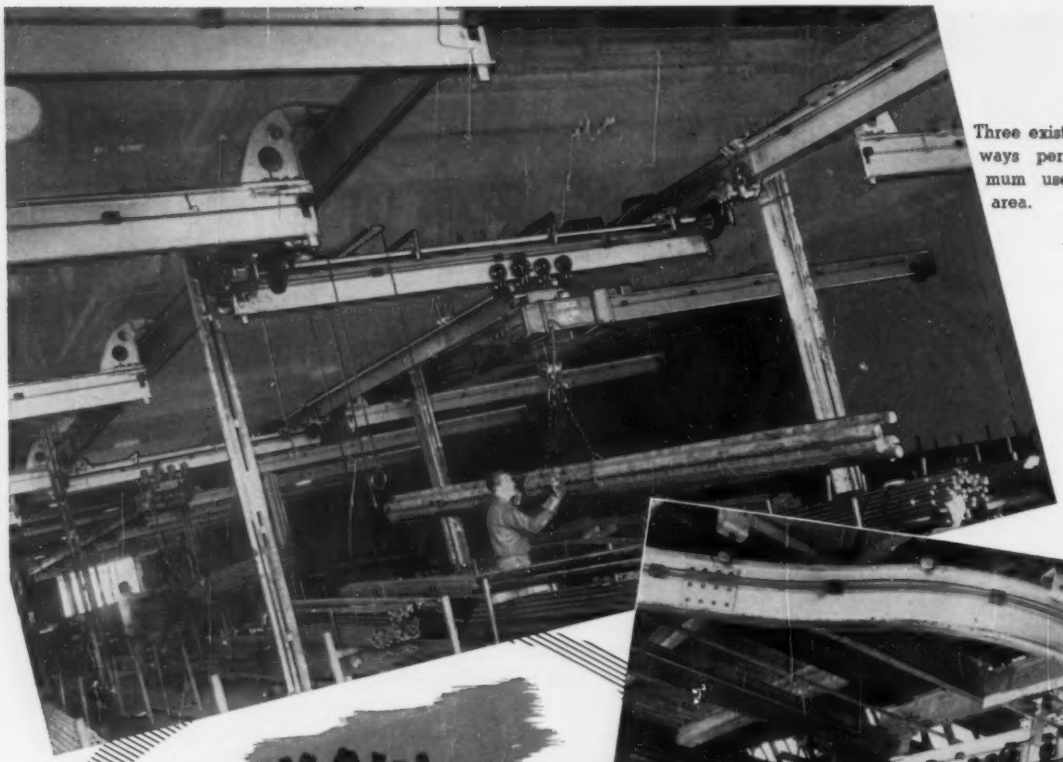
Your future and that of your company is wrapped up in the nightmare you have regularly involving: How much to expand? How far ahead to order? What to do about prices? Where will my company be 10 years from now? How much debt shall we carry? Shall we merge or shan't we? Diversify or stay put?

You can't stand still in this new industrial era. If you don't expand and move ahead you are going backward. The longer you take to make up your mind what you are going to do the further ahead your competitor has gone—and the harder it will be for you to make up lost time; if you can.

Think of the future this year—not of the past—when you decide where you and your company are going.

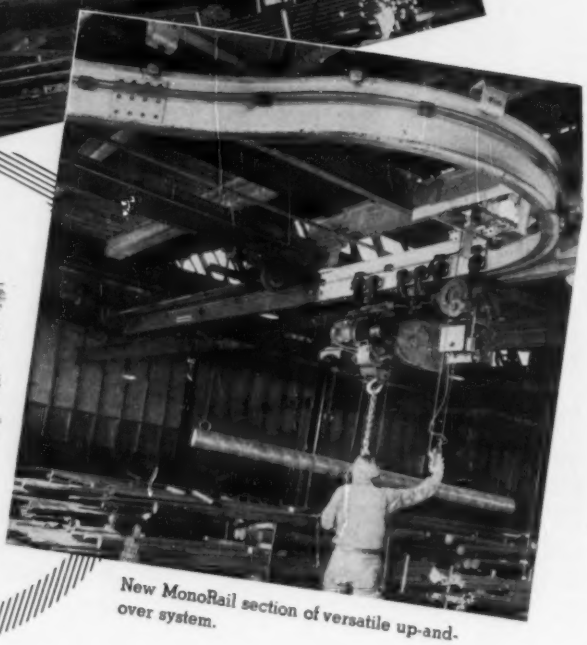
Tom Campbell

EDITOR-IN-CHIEF



Three existing craneways permit maximum use of floor area.

new MONORAIL ties into old... for flexible system



New MonoRail section of versatile up-and-over system.

A newly engineered section was added to three existing MonoRail craneways in this bar stock warehouse. As a result, incoming material can be picked up from a car and transported on this highly efficient overhead system to storage area. When the raw stock is needed, this up-and-over system has it there on schedule. If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you answer it.

Member of Materials Handling Institute - MonoRail Association

Photos courtesy of Super Steels, Inc., Chicago, Ill.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13103 ATHENS AVENUE
CLEVELAND 7, OHIO

dear editor:

letters from readers

Labor Chaos, 1912

Dear Sir:

You probably have access to old copies of IRON AGE and refer to them now and then for ideas on editorial copy for today. Reading the enclosed from the February 22, 1912, issue of THE IRON AGE, it made me wonder just what might be your letters-to-the-editor replies should reprint of this particular editorial appear in THE IRON AGE today? Rather startling, I imagine. *James T. Cunningham, Toledo, Ohio.*

Following are extracts from THE IRON AGE editorial of Feb. 22, 1912.—Ed.

What some workmen affected think of the national eight-hour law is shown at the works of the Fore River Shipbuilding Company, Quincy, Mass. Some 300 draftsmen went on what was practically a strike because being compelled to work under this rule, they were deprived of their Saturday half holiday. The contract for the new battleship to be built at this yard for the United States Government provides that no person may be employed more than eight hours in a day, and therefore that length of workday must prevail six days a week. The men cannot work five days of nine hours each and three hours on Saturday morning, and much dissatisfaction has been expressed by the very persons whom the law is presumed to benefit.

Radical Action

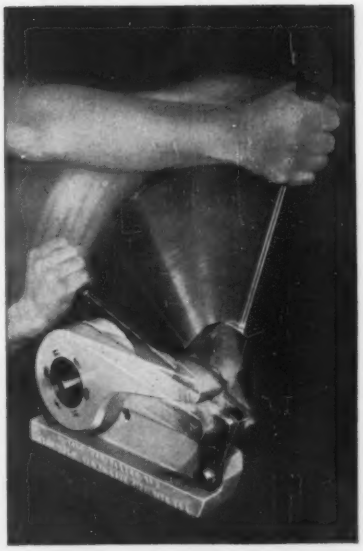
A great deal of discussion has arisen from the cutting down of legal working days in industrial plants, for it strikes many individual works. The length of a working day would have been reduced as a matter of evolution had there never been any legislation. One employer after another would have taken a step forward in this direction, and others would have followed. In fact, employers have from time to time gone ahead of legislative action and reduced working hours without decreasing the weekly earnings of their people. Occasionally some manufacturer takes very radical action in reducing working time, in the belief that he is establishing a schedule which will work out to the benefit both of himself and his employees. Such a plan has just become operative in the shops of the S. A. Woods Machine Company, Boston, manufacturer of wood-planing machinery. On January 19, 1912, Frank F. Woods, president of the company and owner of the business, posted the following notice in his works:

"Believing that the shortening of the working hours will not necessarily lessen the amount of production, and recognizing the Saturday afternoon half holiday, the management announces that beginning with this week, January 15-20, the works will hereafter be operated fifty hours weekly. This plan will be made a success, we anticipate, through the same attention now existent and the sincere co-operation of each and every one. It is understood that the former day rate of pay will in no instance be lessened and that for fifty hours' work fifty-four hours' pay will be made. This necessarily increases the rate per hour, but nets for the week the same as formerly."

Is This Extreme?

This action may be pronounced extreme, but it was taken after many months of consideration, and in the belief that the additional cost would be more than made up in increased efficiency. The men in these shops, 300 in number, are given an increase in hourly wage to compensate for the decrease in working hours, so that their weekly pay envelopes contain as much money as if the change had not been made.

The case is particularly interesting as the antithesis of the situation at Lawrence. In that instance the employers were forced by the State to reduce their working hours, and the operatives attempted to force them to make a compensating increase in the hourly wage.



CUT BAR STOCK up to 5/8" Diameter

Accurately, Instantly with a DI-ACRO* ROD PARTER

The shearing-breaking action of a Di-Acro Rod Parter allows most bar stock to be cut without burr and distortion. After parting, the bar is easily inserted into a hole its same diameter and the end can be threaded or riveted without further processing.

Holes in cutting heads accommodate eleven different round stock sizes. Also special heads for cutting square, and other shaped bars.

BOTH HAND AND POWER MODELS AVAILABLE

Instantaneous cutting action with Di-Acro Power Rod Parter. Rate of production is limited only by speed with which stock can be fed. Motor driven flywheel, other moving parts housed in welded, steel cabinet.

*pronounced Die-ack-ro

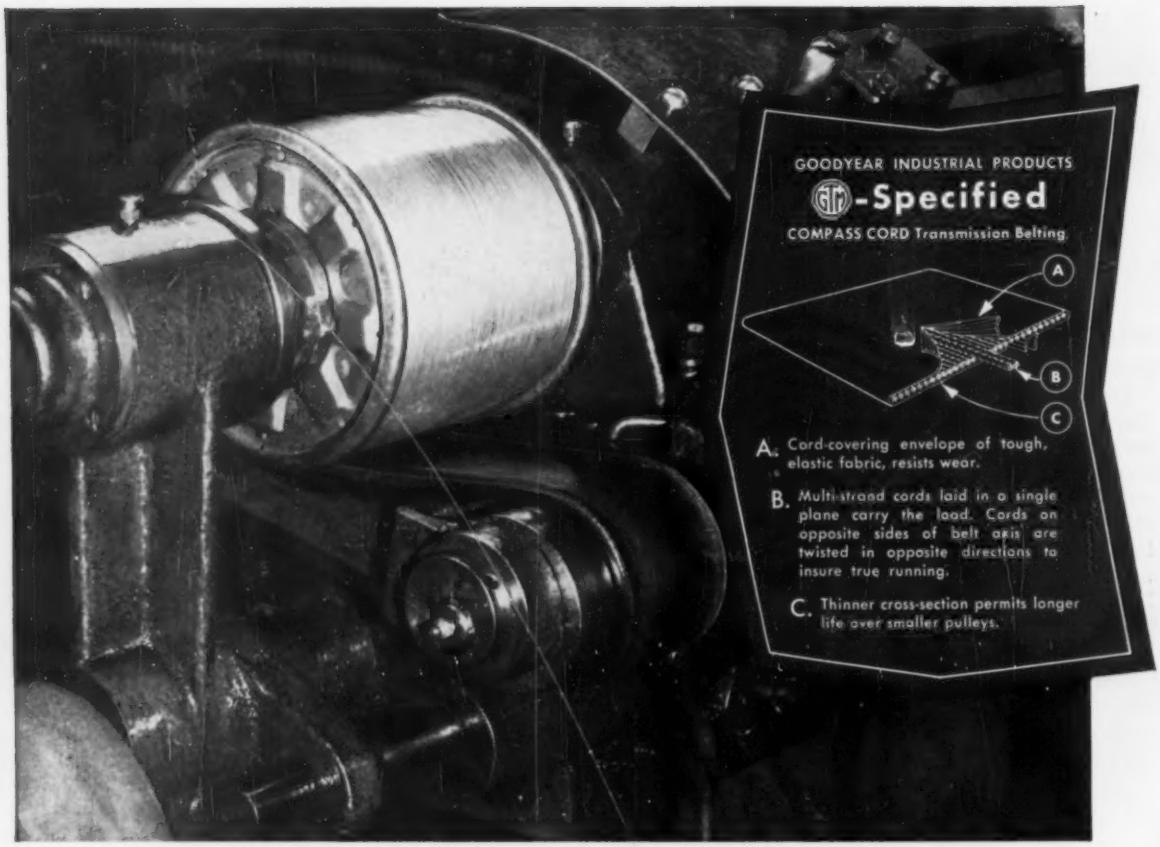
Like More Information? . . . Send for 32-Page Catalog

Gives complete details on hand and power operated Di-Acro Rod Parters, Benders, Brakes, Notchers, Punch Presses, Rollers and Shears.

Creators of "DIE-LESS DUPLICATING"

O'NEIL-IRWIN MFG. COMPANY
302 Eighth Ave.
LAKE CITY, MINN.

di-acro PRECISION METALWORKING MACHINES


GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
COMPASS CORD Transmission Belting
A
B
C
A. Cord-covering envelope of tough, elastic fabric, resists wear.
B. Multi-strand cords laid in a single plane carry the load. Cords on opposite sides of belt axis are twisted in opposite directions to insure true running.
C. Thinner cross-section permits longer life over smaller pulleys.

1200% more life

from wire-winding belts

ONCE steel wire is drawn, it must be wound on spools. This is done on special machines with the help of short, endless belts.

Previously used belts lasted only six weeks. Excessive oil, severe abrasion, short centers and high speed were the reasons for such short life. The G.T.M.–Goodyear Technical Man–was consulted. He suggested COMPASS CORD Transmission Belts (see blueprint) with oil-resistant top covers.

RESULT: These endless cord belts *cost less than half* of those formerly used–*last an average of 18 months* – cut down-time and maintenance costs inestimably.

How can the G.T.M. and COMPASS CORD Transmission Belts cut your drive costs? Find out by contacting him, your Goodyear Distributor or writing Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

COMPASS CORD TRANSMISSION BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

Compass–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

fatigue cracks

by William M. Coffey

The Annual

THE IRON AGE once again presents its Annual Review and Forecast issue, which marks the end of our first century of continuous publication and begins the second. We sincerely feel that you will find this issue the very best of the "annuals" published in that long period. It looks backwards and forwards as it has in the past, but with a new approach liberally sprinkled with useful new features.

We introduce, for instance, for the first time in the annual, a special section on *Atomic Energy* — what it means to industry, its problems and potentialities, a report on the first developments of atomic *power*.

Because of the great impact of the CIO-AFL labor merger, you'll find in *Labor Roundup*, a new section dealing with what a united labor front can mean to your business in 1956. Because this is an election year and government policies will be conditioned by election year politics, you will find in *Government Roundup* an analysis of 12 national issues to be faced by Congress before November that will directly affect your own plans and policies.

We were especially fortunate this year, too, in securing the services of Arno H. Johnson, vice president and director of research for J. Walter Thompson, for the *"Special Economic Forecast"* which in interesting question and answer form reassures those people who say the boom will bust. Mr. Johnson, on the contrary (as do the editors of IRON AGE), believes that we will reach a $500 billion economy by 1965 and today's prosperity will appear shabby by comparison.

We pin-point your special production problems with a review and forecast covering machinery . . . forging . . . metallurgy . . . casting . . . heat treating . . . welding . . . and metal finishing.

You would think that this would be enough. But no. You'll even find the best of humor on page 11. No doubt about it, the editors have strained themselves to make this, the Annual 1956 Review and Forecast issue, the best ever in all 100 years of forecasting.

The Humor

The city desk got a phone call from a correspondent in a small, nearby town, who said, "I think we've got the o'dest man in the world living here. At least, he looks like it. Better send a reporter."

A newsman rushed down to interview the man, a shrunken, shriveled mass of wrinkles and bones. "To what do you attribute your age?" asked the reporter. "A gallon of whiskey a day," croaked the venerable one. "Plenty of women. Practically no sleep. I smoke and drink and live it up all night every night."

"Amazing," said the reporter. "Just for the record, exactly how old are you?"

"I'll be 24 next month."

No doubt about it. Best Annual ever.

Puzzlers

A blacksmith made his 3-year-old hunting dog a chain of 100 links from ⅛-in. steel rod. Each link measured 1 in. long, outside dimension. This chain, he estimated, would last exactly 2 years. He fastened one end to a tree, 1 foot above the ground, with a large staple, then welded the other end to his dog's collar at a point which, on the dog's neck, was exactly 7 in. above the ground. If the tree grows 1 ft in 3 years, how far will the dog be able to pull his collar from the tree in one year, and what is the original distance?

This one should cut everybody down to size, including even Miss Post, even now.

If your sawing costs are mounting because you're not getting consistent low-cost operation, maximum production, and minimum downtime, call your Victor Distributor. He's the man who can bring your costs down to eye level. Once he's listened to your troubles, he'll recommend the *right* Victor Hand and Power Hacksaws, Metal and Wood Cutting Band Saws, and Hacksaw Frames for all your needs.

Your Victor Distributor will especially want to tell you about Victor "Moly"® High Speed steel blades. He'll tell you that "Moly" blades can save you real money because they outlast standard steel blades 10 to 1, cut as well as the *best* high speed steel blades made, and yet are substantially lower in cost!

And be sure to ask your Victor Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts. They're packed full of interesting information.

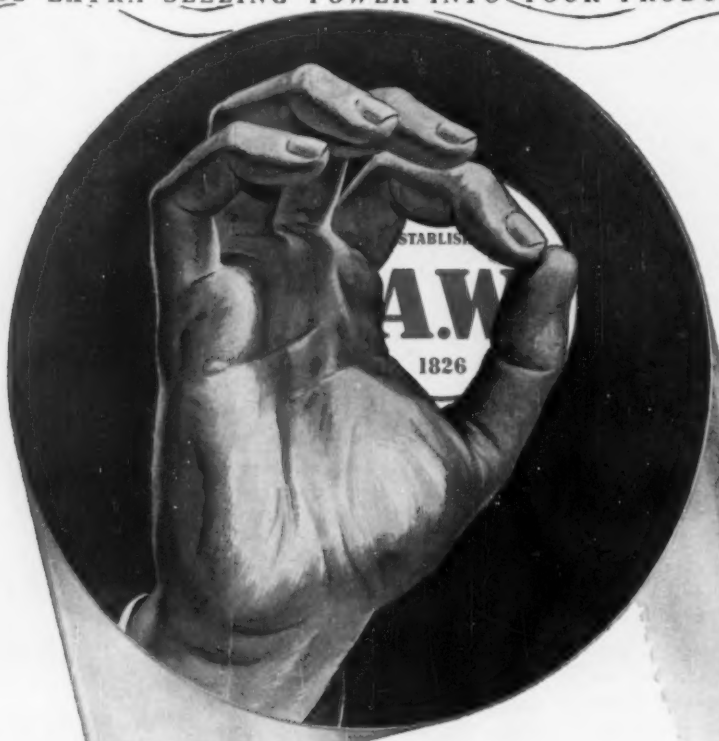
Sold Only Through Recognized Distributors

1890

VICTOR

SAW WORKS, INC., MIDDLETOWN, N.Y., U.S.A.
MAKERS OF HAND AND POWER HACKSAW BLADES, FRAMES, AND METAL AND WOOD CUTTING BAND SAW BLADES

BUILDS EXTRA SELLING POWER INTO YOUR PRODUCTS



HOT
. . . rolled strip steel . . .
COLD

TO ORDER

Made and delivered as specified —ready to meet your toughest demands—hallmarks of ALAN WOOD strip steel.

Produced by modern, up-to-date, continuous mills under the most rigid metallurgical control, ALAN WOOD strip possesses the "custom-produced" requirements of a superior product . . . qualities that build extra selling power and repeat sales into your products.

If you require hot or cold rolled sheet or strip steel . . . choose a specialist who understands your production problems . . . and delivers according to your specifications.

IRON PRODUCTS
"Swede" *pig iron*
STEEL PRODUCTS
Plates (sheared)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip
ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*
A.W. CUT NAILS
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steelmasters for 130 years • CONSHOHOCKEN, PENNA.

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AW-47

dates to remember

JANUARY

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.—Annual meeting, Jan. 9-13, The Sheraton-Cadillac Hotel and Hotel Statler, Detroit. Society headquarters, 29 W. 39th St., New York.

AMERICAN ROAD BUILDERS' ASSN.—54th annual convention, Jan. 11-14, Miami Beach, Fla. Assn. headquarters, World Center Bldg., Wash. 6, D. C.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Winter meeting, Jan. 18-19, Hampshire House, New York City. Society headquarters, 600 Fifth Ave., New York City.

EXPOSITIONS

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

MALLEABLE FOUNDER'S SOCIETY—Semi-annual meeting, Jan. 20, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

COMPRESSED GAS ASSN., INC.—Annual meeting, Jan. 23-24, The Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Annual meeting, Jan. 23-24, LaSalle Hotel, Chicago. Assn. headquarters, 155 E. 44th St., New York.

TRUCK - TRAILER MANUFACTURERS ASSN.—15th annual convention, Jan. 23-25, Edgewater Gulf Hotel, Edgewater Park, Miss. Assn headquarters, 1042 National Press Bldg., Washington, D. C.

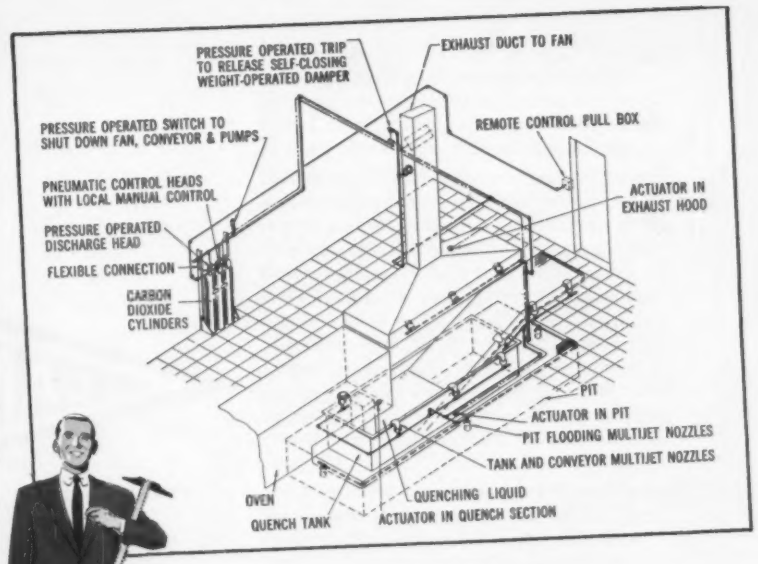
PLANT MAINTENANCE & ENGINEERING SHOW—7th annual conference, Jan. 23-26, Convention Hall, Philadelphia. Society headquarters, Clapp & Polick, Inc., 341 Madison Ave., New York.

NATIONAL RURAL ELECTRICAL COOPERATIVE ASSN. — 14th annual meeting, Jan. 23-26, St. Louis, Mo. Assn. headquarters, 155 E. 44th St., New York City.

AMERICAN STANDARDS ASSN.—Gaillard Seminar on industrial standardization, Jan. 23-27, New York City. Assn. headquarters, 70 E. 45th St., New York.

ENGINEERS JOINT COUNCIL—Second annual general assembly, Jan. 26-27, Hotel Statler, New York City. Society headquarters, 29 W. 39th St., New York.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Winter general meeting, Jan. 30-Feb. 3, Hotel Statler, New York. Society headquarters, 36 W. 46th Street, New York City.


PRESSURE OPERATED TRIP TO RELEASE SELF-CLOSING WEIGHT-OPERATED DAMPER
EXHAUST DUCT TO FAN
PRESSURE OPERATED SWITCH TO SHUT DOWN FAN, CONVEYOR & PUMPS
REMOTE CONTROL PULL BOX
PNEUMATIC CONTROL HEADS WITH LOCAL MANUAL CONTROL
ACTUATOR IN EXHAUST HOOD
PRESSURE OPERATED DISCHARGE HEAD
FLEXIBLE CONNECTION
CARBON DIOXIDE CYLINDERS
PIT
ACTUATOR IN PIT
PIT FLOODING MULTIJET NOZZLES
TANK AND CONVEYOR MULTIJET NOZZLES
OVEN
QUENCH TANK
QUENCHING LIQUID
ACTUATOR IN QUENCH SECTION

HAZARDS LIKE QUENCH TANKS...

NEED THIS

SPECIAL FIRE PROTECTION!

IN THE PLAN ABOVE, you see a typical Kidde fire extinguishing system installation for the protection of one of industry's most dangerous fire hazards. However, *all* Kidde quench tank installations are not exactly like this one, since Kidde treats each quench tank as a *special* hazard which requires *special* fire protection!

Using safe, efficient carbon dioxide, Kidde systems snuff flames quickly, cleanly. The CO_2 leaves no mess to harm machinery or equipment, will not even damage work-in-process. And, thanks to patented Kidde rate-of-temperature-rise detectors, Kidde systems remain on guard 24 hours a day, completely independent of outside power sources.

Kidde systems use no clumsy mechanical triggering methods, have no falling weights. Pneumatic or Electrical Control Heads insure instant and complete CO_2 discharge. The moving parts of a Kidde system are self-enclosed for safety, need no replacement after a fire, have easy-to-read visual indicators which show at a glance if system is "set" or "released." What's more, special Directional Valves on the Kidde system let you protect more than one hazard from the same cylinder bank, giving you the most versatile protection on the market!

Without obligating yourself in any way, let the Kidde man analyze the fire hazards in your plant. Then let him show you our recommendations. For more information, write Kidde today.

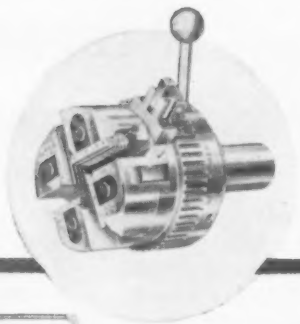
Kidde

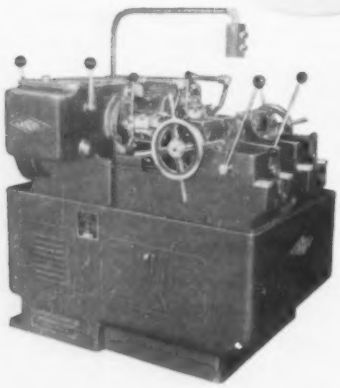
Walter Kidde & Company, Inc.
149 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada, Ltd.
Montreal—Toronto

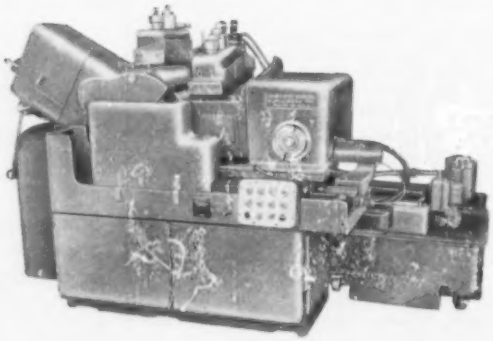
The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

LANDIS

Cutting, Grinding, Tapping,







Cutting....

The 8C LANDMACO—one of five new Thread-Cutting machines designed for precision threading of workpieces from 3/16" to 6¾" in diameter. • Above is the new 2" LANDMATIC—one of the many Standard and Special Thread-Cutting Heads designed for application to Automatics and Turret Lathes.

Grinding....

The CENTERLESS Thread Grinder for continuous thru-feed grinding of threads from 1/16" to 2" in diameter at mass production rates. Infeed grinding attachment available for threading shouldered or headed workpieces which cannot be cut or rolled due to material hardness.

Rolling THREADS

More than 350 sizes and styles of Machines and Tools are manufactured by LANDIS for producing all types of internal and external, straight and tapered threads by one of these three basic threading methods.

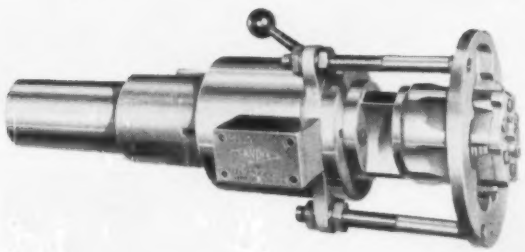
This extensive line of Threading Equipment is the result of more than 50 years of research and development—exclusively in the field of Thread Generation. Our most recent additions include the revolutionary LANHYROL Thread Rolling Machine, the new Model C LANDMACO Bolt Threading Machines, and the #1 Automatic Nipple Threading Machine. We are the largest company in the world today devoted entirely to manufacturing equipment for producing threads—by Cutting, Grinding, Rolling, or Tapping.

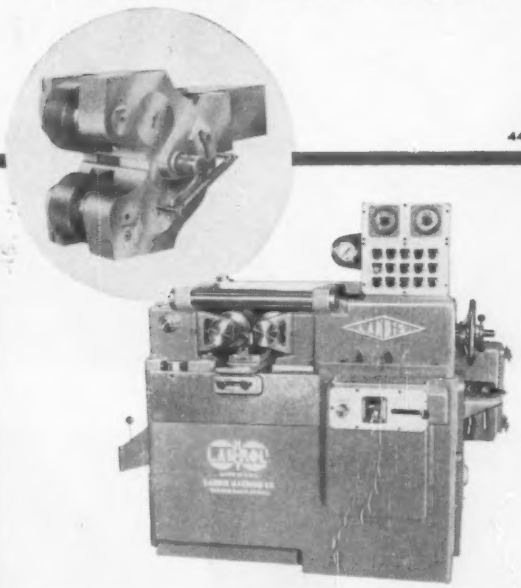
The Threading Experience developed through these years is an important LANDIS extra available to all manufacturers. Our Engineering Department will be glad to work with your organization on any problem dealing with method, equipment, or thread design. Send us your specifications—let us recommend the Threading Equipment best suited to your need.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA U. S. A.

440-2-C



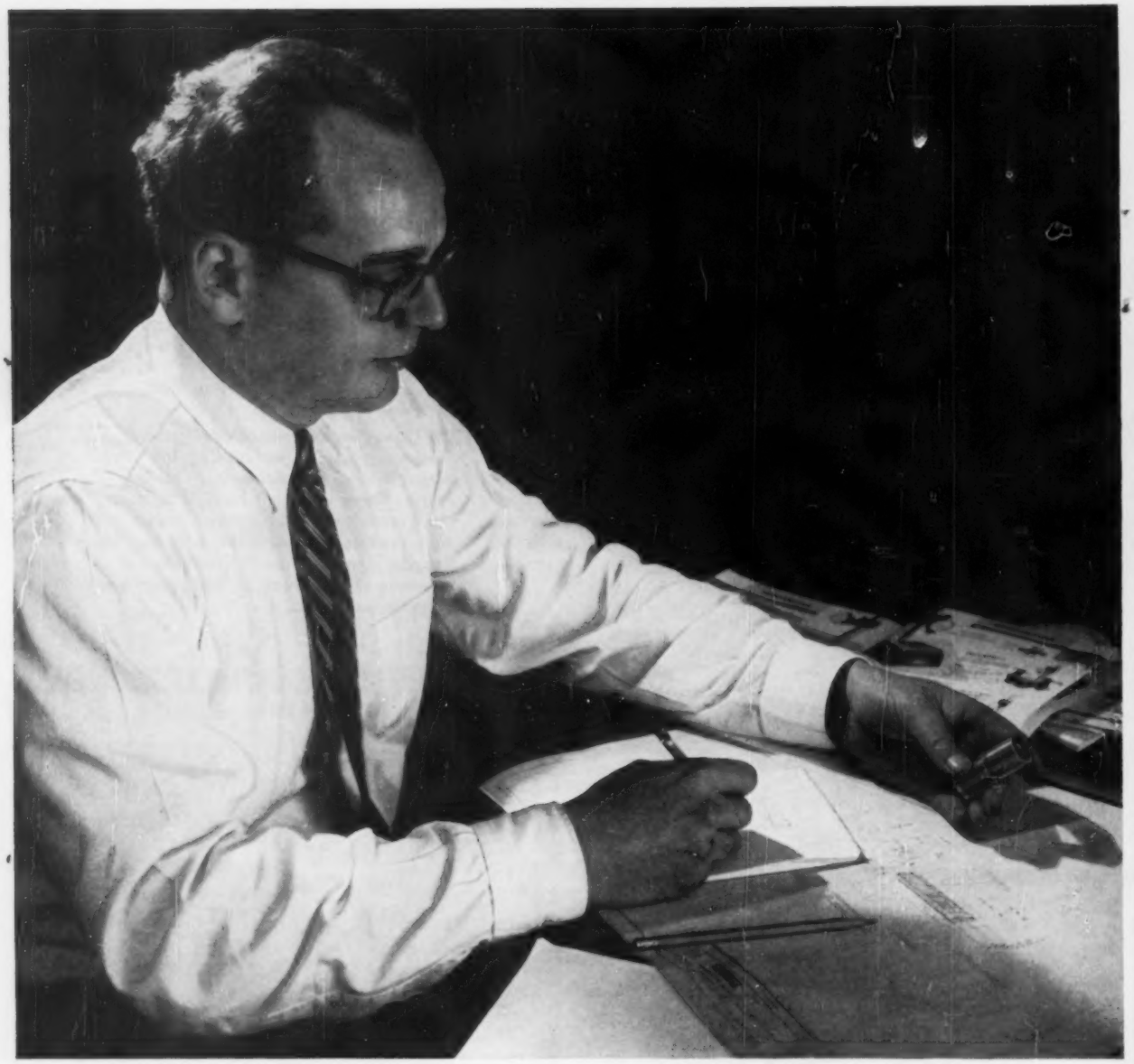


Tapping....

The LL Collapsible Tap for producing internal tapered threads featuring detachable heads for wide range coverage. Other LANDIS Taps include Rotary or Stationary Standard Taps for straight or tapered threads, Solid Adjustable Taps, Valve Taps, and Taps for other special applications.

Rolling....

The new LANHYROL Thread Rolling Machine, revolutionary in its output, accuracy and flexibility. • Above is the #20 LANROLL Attachment—one of five sizes of Thread Rolling Attachments for Automatics and Turret Lathes.



DIAL INDICATOR GAGE
checks O.D. runout and squareness of face of hobs quickly, accurately, and for much less cost than any other gaging system.

AIR GAGES
check I.D. and chordal height of arc-like workpieces. The Dial Indicators check squareness of faces and concentricity of two diameters. Typical illustration of how Federal combines gaging systems to suit requirements.

MULTIPLE DIMENSION "PICTURE PANEL" GAGE
checks overall length and five outside diameters of projectiles. Shows off-tolerance parts by flashing colored tolerance lights.
Electricators show how much tolerance varies (from-nominal).

It's time to buy the right gage

If you are the one in your organization who is responsible for the dimensional accuracy of the parts that go into the product, chances are you have not given enough consideration to the COST OF INSPECTION.

When you realize it's generally considered good practice to hold inspection costs within 5% of production costs, it's worthwhile stopping to investigate what you pay for inspection. And when actual case tests show that it takes five times longer to inspect a hole with conventional plug gages than with modern indicating gages, then the TYPE OF GAGE you use becomes important.

Too often, a gage is bought to inspect certain dimensions without due consideration of other factors which may be of even greater importance than its ability to gage accurately. Buying any type or system of dimensional gage with a higher degree of accuracy than required . . . and at a higher price, *is just poor economy.*

The best inspection departments we have known do not let tradition or fly-by-night practices overshadow consideration of better methods. Neither do good gage buyers blindly accept new gages without carefully investigating the different gaging methods and getting impartial recommendations.

Federal has been making gages exclusively for many years and we have today the most complete line of accuracy-proven, modern gages in the world. This special background of continuous and extended experience in gaging has taught us to analyze and solve gaging problems with certainty and to render sound service to our customers.

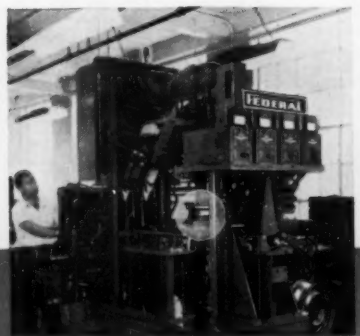
Since Federal makes all modern gaging systems, we can be impartial in our recommendations and supply you with whichever system best meets your needs. This can be of distinct advantage to you, for it isn't likely that a salesman will recommend the *best* system if he hasn't got that system to sell!

There is a Federal representative near you, ready to give you the facts *impartially.*

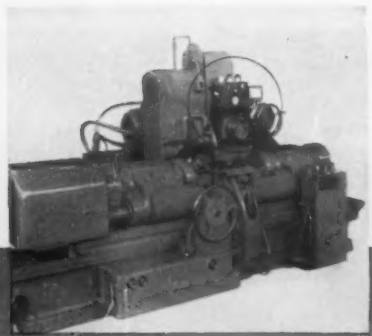
FEDERAL PRODUCTS CORPORATION
6131 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** *First*

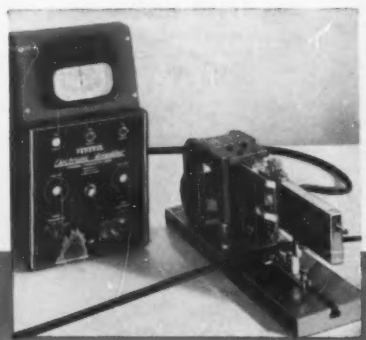
FOR RECOMMENDATIONS IN MODERN GAGES . . .
Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, Sorting, or Automation Gaging



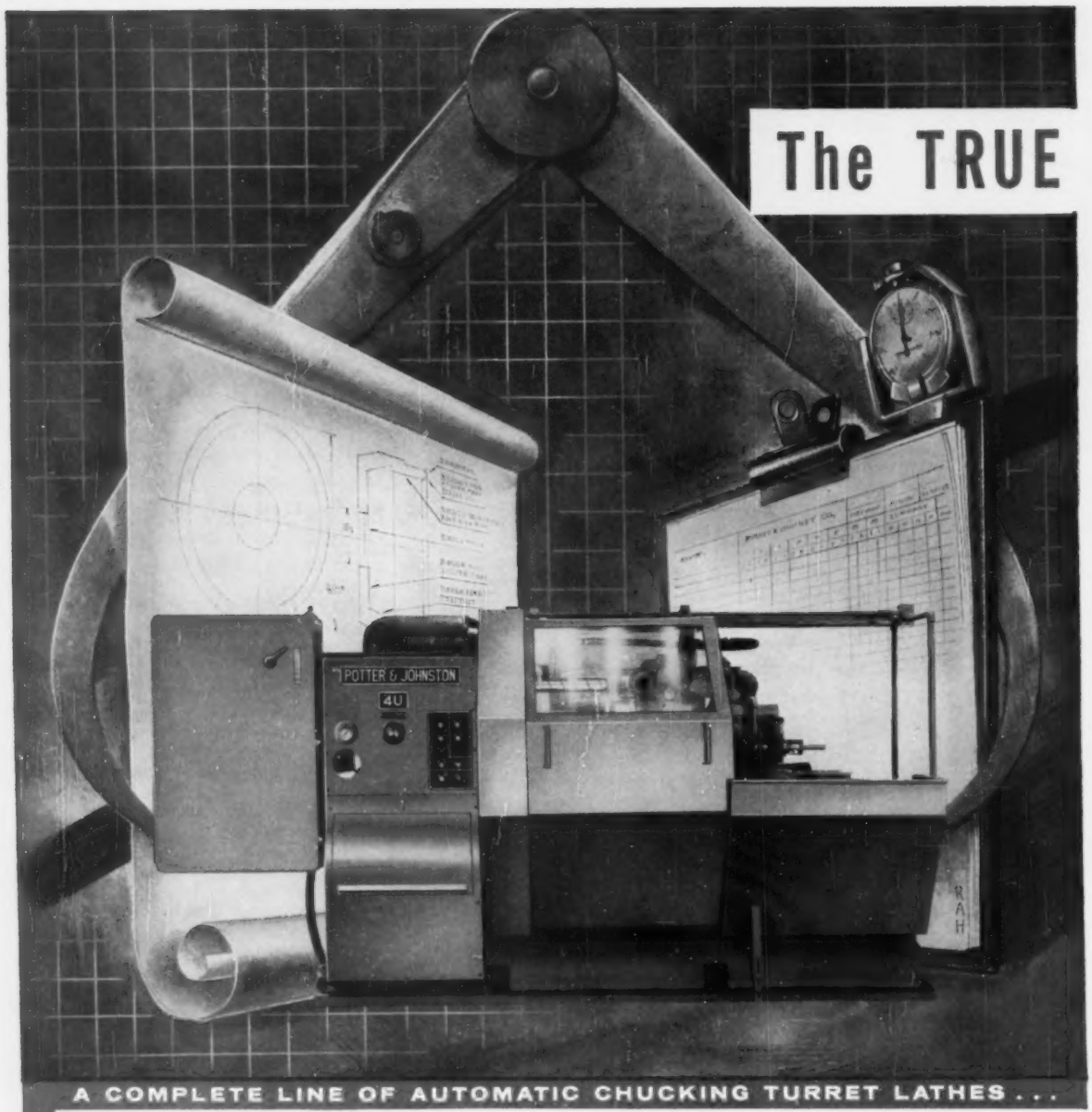
ELECTRONIC AUTOMATIC SORTING GAGES inspect tubeless tire wheels for radial and lateral runout. Gages are in-process type and are conveyor-fed.



MACHINE CONTROL GAGE uses Air-Electric gaging system to automatically control grinding wheel on cylindrical grinder. Gage backs wheel off at finish diameter. Lights indicate approach and final size.



ELECTRONIC CONTINUOUS MEASURING GAGE is used to detect variations in the width of moving picture film after it has been slit into its standard width.



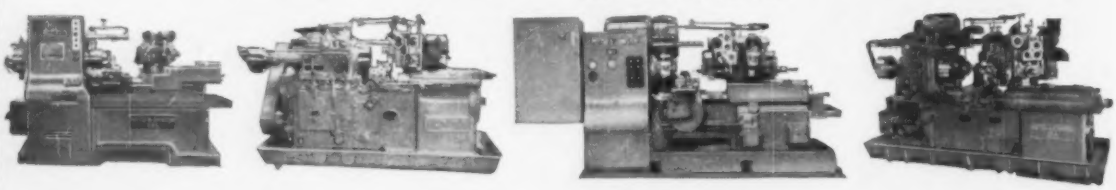
A COMPLETE LINE OF AUTOMATIC CHUCKING TURRET LATHES . . .

3-U SPEED-FLEX
A high speed machine for small parts. Spindle speeds to 1445 rpm. Chuck sizes: 6″-8″.

4-D AUTOMATICS
Two sizes, Standard and Elevated. Spindle speeds to 696 rpm. Chuck sizes: 10″, 12″, 15″.

4-U AUTOMATIC
A rugged workhorse with extra power for fast metal removal with carbide tools. Spindle speeds to 1177 rpm. Chuck sizes: 10″, 12″, 15″.

5-D POWER-FLEX
Three sizes: Standard, Elevated and Elevated with Long Travel. Spindle speeds to 610 rpm. Chuck sizes: 15″, 18″.



WHATEVER THE SPEED, FEED, FINISH or MATERIAL . . .
YOU CAN DO THE JOB BETTER ON A POTTER & JOHNSTON AUTOMATIC

MEASURE of PROSPERITY...

YOUR ABILITY TO PRODUCE!

Not dollars in the bank, but dollars invested in modern machine tools that increase your ability to produce . . . here is the *true* measure of your Company's prosperity today . . . and your assurance of *continued* prosperity tomorrow.

And before you invest, investigate the new Potter & Johnston Automatic Chucking Turret Lathes. Even on small quantity production of component parts, they have repeatedly proved efficient and economical. Now the advantages of divided labor costs can be brought to every type of production run. Amply powered and rigidly built to handle today's tough alloys with speed and accuracy, P&J Automatics provide the increased output and reduced production costs that pay BIG dividends to *every* plant, large or small.

WRITE NOW . . . Ask for fully descriptive literature on any of the Automatics in the complete P&J line. Send your prints or sample parts for tooling recommendations and production estimates. No obligation, of course.

Precision Production Tooling for more than Fifty Years

POTTER & JOHNSTON COMPANY

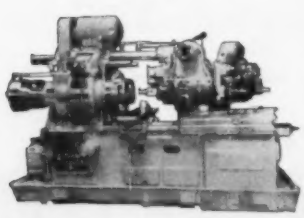
PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

P&J Factory Representatives are available through your nearby Pratt & Whitney Branch Office

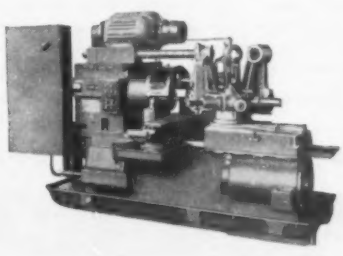
5-D Two Spindle POWER-FLEX

Added capacity with minimum initial cost and floor space. Two standard sizes: 5-D2-9″ and 5-D2-15″. Chuck sizes: 10″, 12″, 15″.



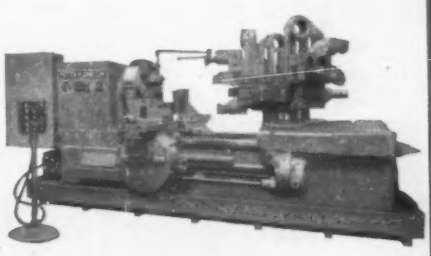
6D-40 AUTOMATICS

Two sizes with various combinations of travels and bed lengths. Spindle speeds to 471 rpm. Chuck sizes: 18″, 24″, 30″.



10-U AUTOMATIC

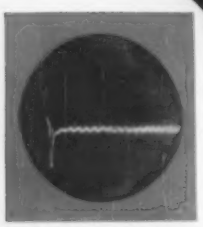
For new speed and economy on your really BIG jobs. Chuck sizes: 30″, 36″, 42″.



MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

VICKERS® Controlarc DC Arc Welder Survives Punishing "Durability Test"

OVER 1,000,000 CYCLE HIGH-SPEED REPETITIVE ARC TACK TEST EQUIVALENT TO MORE THAN TWO YEARS OF CONTINUOUS USE



This unretouched oscilloscope photograph shows the voltage trace occurring when the arc was broken very quickly during the test, subjecting the CONTROLARC welder to severe abuse.

"How much punishment can the Vickers CONTROLARC DC Welder take?"

Vickers engineers decided to find out.

A 200-ampere CONTROLARC was subjected to a gruelling durability test. Every nine seconds the welder was charged with a six-second load of 250 amperes (50 amperes above rated capacity) at 27.5 volts. After 198,900 "makes" and "breaks" the load was boosted to 300 amperes at 27 volts. When the test was concluded the CONTROLARC had survived 1,004,522 of these charges, *and was still going strong*—with no apparent effect on any part of the welder. This test simulated arc tacking on production at 4 tacks continuously per minute on an 8-hour day basis for over two 300-day years.

For complete information about this rugged, dependable welder, write today for new bulletin.

Some territories open for qualified dealers. Write for details.

VICKERS ELECTRIC DIVISION

VICKERS Inc. a unit of Sperry Rand Corporation

1857 LOCUST STREET • SAINT LOUIS 3, MISSOURI

another revolutionary development by La Salle

THE NEW fatigue-proof STEEL BAR

gives HIGH STRENGTH... WITHOUT HEAT TREATING

"FATIGUE-PROOF" steel bars offer high strength in-the-bar . . *without the expense and trouble of heat treating.* Tensile strength is in the 140,000 to 150,000 p.s.i. range . . hardness, which is related to this strength level, is approximately 30 Rockwell "C."

"FATIGUE-PROOF" has uniform strength across the bar . . and this uniformity is maintained from bar to bar . . lot to lot. This remarkable uniformity of strength makes "FATIGUE-PROOF" ideal for applications in the 140,000 to 150,000 p.s.i. range that formerly required heat treated carbon and alloy steels, either hot rolled or cold drawn.

yet it's EASY TO MACHINE

"FATIGUE-PROOF" machines at least 25% faster than annealed alloys . . 50% to 100% faster than heat treated alloys.

"FATIGUE-PROOF's" excellent machinability permits faster speeds, heavier feeds, better tool life . . your production rates will increase.

Distortion from machining is held to a minimum . . surface finish is greatly improved.

Our Sales Engineers will be happy to show you how you can cut costs and eliminate problems and provide samples for test purposes.

JUST PUBLISHED! Ask for your copy of this new 20-page booklet which gives additional information on the remarkable new "FATIGUE-PROOF."

La Salle STEEL CO.

1436 150th STREET · HAMMOND, INDIANA

Manufacturers of America's Most Complete Line of Quality Cold-Finished Steel Bars

LA SALLE STEEL CO.
1436 150th Street
Hammond, Indiana

Please send me your "FATIGUE-PROOF" Bulletin.

Name_____

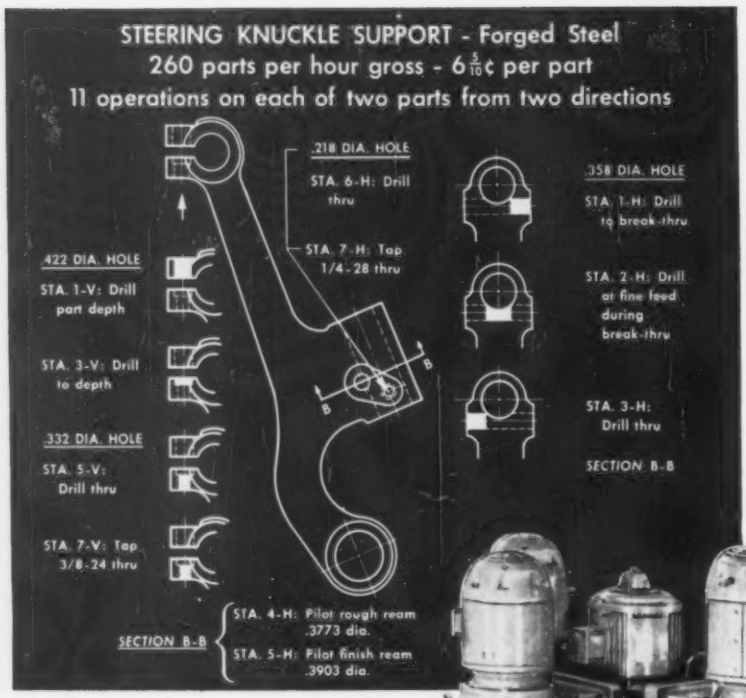
Title_____

Company_____

Address_____

City_____ Zone____ State_____

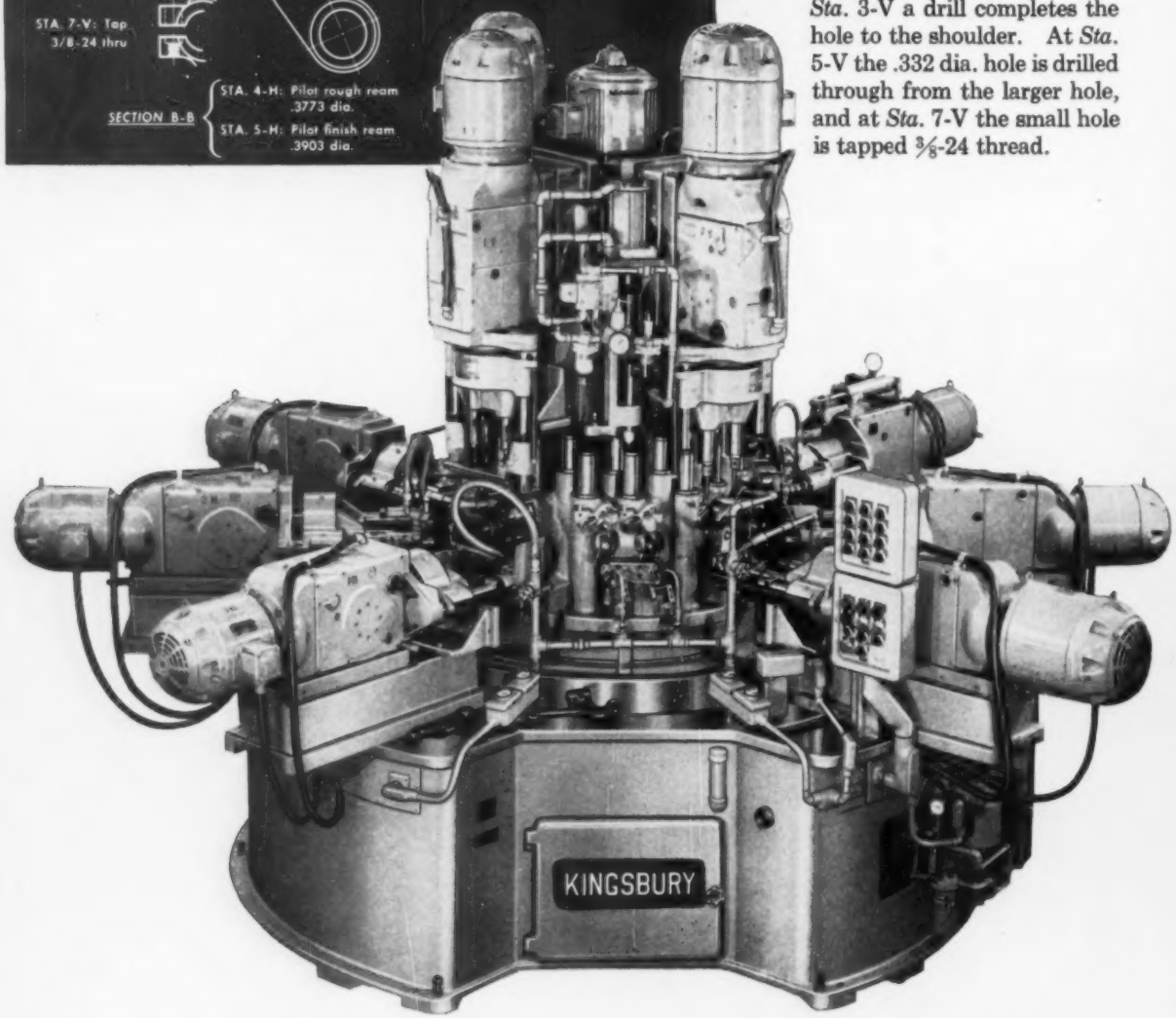
Where slow-down speeds-up "Operations Kingsbury"


STEERING KNUCKLE SUPPORT - Forged Steel
260 parts per hour gross - 6 5/10¢ per part
11 operations on each of two parts from two directions
.218 DIA. HOLE
STA. 6-H: Drill thru
STA. 7-H: Tap 1/4-28 thru
.422 DIA. HOLE
STA. 1-V: Drill part depth
STA. 3-V: Drill to depth
.332 DIA. HOLE
STA. 5-V: Drill thru
STA. 7-V: Tap 3/8-24 thru
.358 DIA. HOLE
STA. 1-H: Drill to break-thru
STA. 2-H: Drill at fine feed during break-thru
STA. 3-H: Drill thru
SECTION B-B
SECTION B-B
STA. 4-H: Pilot rough ream .3773 dia.
STA. 5-H: Pilot finish ream .3903 dia.

Drill three holes, ream one, tap one . . . This *is* a simple job — for a Kingsbury, but the part must be worked on by 11 units at seven working stations to insure uniform accuracy and production.

In order to produce 260 pieces per hour gross, each work-holding fixture holds two parts, and each unit has an auxiliary head and works on a hole in each part.

The blueprint at the left tells the story. Notice the .422 dia. hole in the pinch-bolt bearing. This section required four operations from the *vertical* position: At *Sta.* 1-V the .422 hole is drilled through to the milled slot. At *Sta.* 3-V a drill completes the hole to the shoulder. At *Sta.* 5-V the .332 dia. hole is drilled through from the larger hole, and at *Sta.* 7-V the small hole is tapped $\frac{3}{8}$-24 thread.



for greater accuracy and higher production . . .

Now look at Section B-B, the .358 dia. *horizontal* hole. It has a break-through with the axis hole, and must be accurate. This work is accomplished at five stations. *Sta.* 1-H drills to the break-through at normal feed. *Sta.* 2-H drills *at fine feed* during the break-through. *Sta.* 3-H completes the drilling at normal feed. At *Stas.* 4-H and 5-H, pilot reamers rough- and finish-ream the hole to exact specifications.

The .218 dia. hole involves simple drill-thru and tap operations, at *Stas.* 6-H and 7-H.

Each Kingsbury machine is designed and built to achieve three prime objectives: 1) *accurate* interchangeable parts as specified, produced at the 2) highest practicable production rate, and 3) at a cost per part which will make the machine a wise investment. And each Kingsbury machine proves itself in a trial run before it is delivered.

Combined operations promote savings in equipment, and lower costs per part

When we designed the Kingsbury machine shown below, we estimated its production at 250 parts per hour gross. We were low: it's producing 308 parts per hour gross, at 2 4/10c per part.

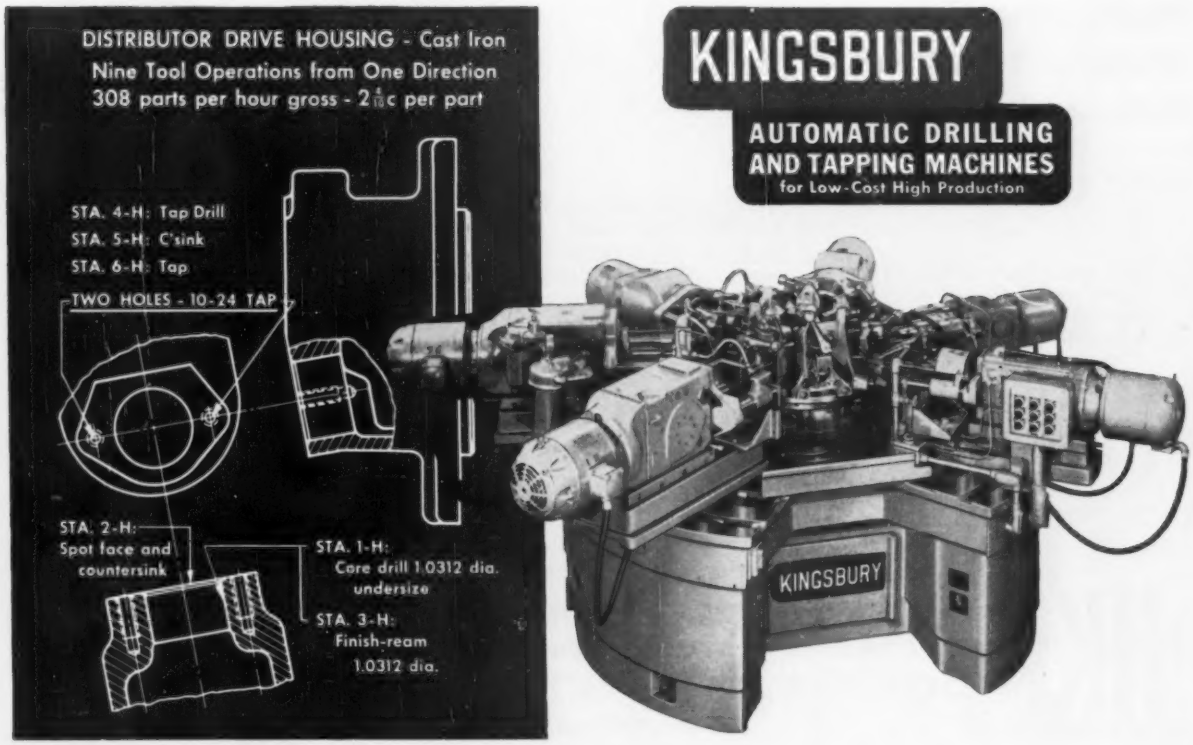
The machine has an 80-inch base on which are mounted six drilling and tapping units. A 24-inch index table with seven work-holding fixtures indexes through seven stations — one for loading and unloading.

All work is performed horizontally. The 1.0312 dia. hole is core-drilled undersize at *Sta.* 1-H, and finish-reamed 1.0312 at *Sta.* 3-H. *Sta.* 2-H spot-faces the joint face and forms countersink.

At *Stas.* 4, 5, 6, the Kingsbury units are equipped with auxiliary heads and drill, countersink and tap (10-24) the two small holes.

This Kingsbury is a good example of the savings in equipment and time which result when operations can be combined without risking uniformity. And, as is true with all Kingsburys, one of the big "secrets" of its success is the design of the work-holding fixtures. A part must be positioned in a matter of seconds, and held securely at each station, if the work is to be accurate. Therefore, the work-holding fixture is the very *heart* of a Kingsbury, and it's built with loving care! Perhaps that's one reason why Kingsburys perform so well!

Kingsbury Machine Tool Corp.
115 Laurel Street
Keene, N. H.


DISTRIBUTOR DRIVE HOUSING - Cast Iron
Nine Tool Operations from One Direction
308 parts per hour gross - 2 4/10c per part
STA. 4-H: Tap Drill
STA. 5-H: C'sink
STA. 6-H: Tap
TWO HOLES - 10-24 TAP
STA. 2-H: Spot face and countersink
STA. 1-H: Core drill 1.0312 dia. undersize
STA. 3-H: Finish-ream 1.0312 dia.
KINGSBURY
AUTOMATIC DRILLING AND TAPPING MACHINES
for Low-Cost High Production
KINGSBURY

Quaker

Maintenance costs slashed by this specially engineered belt

For speed and savings buy from your industrial supply distributor. He can help you select the right belt for your jobs—and, if necessary, bring you the free consultation service of Quaker-Quaker Pioneer field engineers.

Are your hot-materials handling jobs taking an unnecessarily heavy toll in belt costs? They needn't—if you use conveyor belts specially engineered for your specific job conditions. Here's a case that gives real weight to that argument. For 11 months this belt hauled 850,000 tons without requiring replacement—more than double the life of belts previously used on this job. It is one of several types engineered by Quaker-Quaker Pioneer for jobs involving temperatures over 400°F. Some, like this one, are rough top construction enabling the belt to react rapidly to cooling methods. Others are of newly developed compounds, exceptionally heat-resistant to prevent hardening and cracking. Get the cost-saving benefit of this specialization by telling us—or your distributor—*your* problems. Our complete line contains everything you need in industrial rubber products, including hose, packing and moulded rubber for every use.

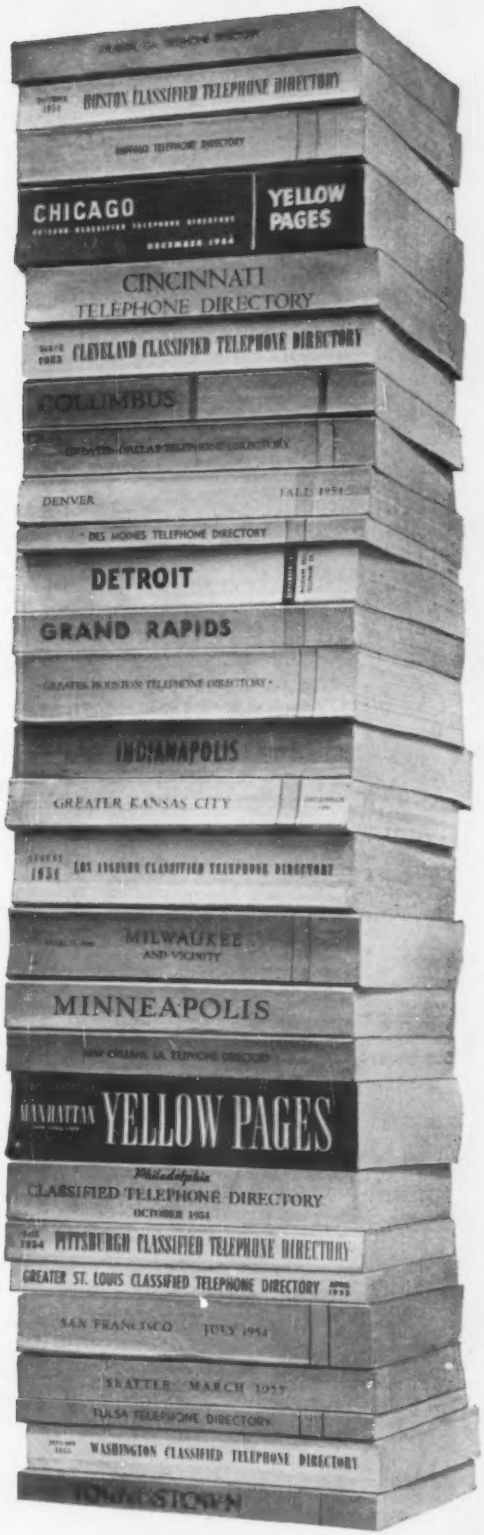
DIVISIONS OF HKP H. K. PORTER COMPANY, INC.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION
Philadelphia 24, Pa.

QUAKER PIONEER RUBBER DIVISION
San Francisco 7, California

Here's where you get the answers to steel problems



● Look under "The Youngstown Sheet and Tube Company" in one of these alphabetical or classified phone books.

They represent the 28 conveniently located district sales offices Youngstown maintains across the country. Offices staffed by men who know the steel business. Men who know and understand **your** steel problems. Men who are qualified to help you get the specific steel you need.

When you want answers to steel problems in a hurry, just call the Youngstown office nearest to you.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

Announcing....
for the first time in the grinding wheel industry.
BAY STATE
ELECTRONIC FORMULATION

..A NEW ELECTRONIC PROCESS

Bay State Grinding Wheel Formulas are now computed AUTOMATICALLY!

ELECTRONIC FORMULATION means this for you:

★ **GREATER ACCURACY IN ENGINEERING.**
The ELECTRONIC FORMULATION system precisely spaces every interval between grade and structure changes equally along a perfect progression. This gives the Bay State abrasive engineer the industry's most accurate measuring device for recommending wheel specifications that will fit your job best.

★ **GREATER ACCURACY IN MANUFACTURING**
Electronic precision replaces the possibilities of human error in figuring formulas which control the manufacture of every Bay State wheel. This precision makes sure you get the special grinding qualities determined best for your job.

★ **GREATER ACCURACY IN DUPLICATION.**
Formulas for every Bay State grinding wheel are preserved on punched cards for electronic computers. This insures absolute accuracy in duplicating wheel formulation, with FASTER ORDER PROCESSING.

★ ★ ★

Truly "Wheels of Progress" in action, the ELECTRONIC FORMULATION *system is an exclusive* BAY STATE *development. Its many advantages are yours when you call your* BAY STATE DISTRIBUTOR, *or factory representative, for complete "on-the-job" engineering service.*

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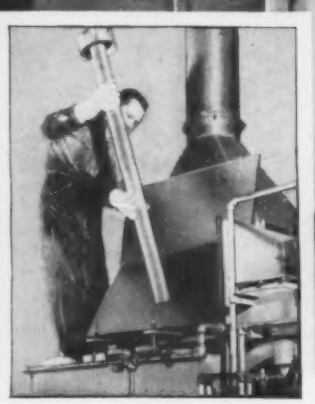
Branch Offices and Warehouses —
Bristol, Conn.; Chicago, Ill.;
Cleveland, Ohio; Detroit, Mich.; Pittsburgh, Pa.
Distributors — All principal cities
In Canada:
Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Manufacturers of all types of Quality Abrasive Products

MORE FURNACE VERSATILITY



Lindberg radiant tube is easy to change. Just turn off furnace, lift old tube out and put in new tube.

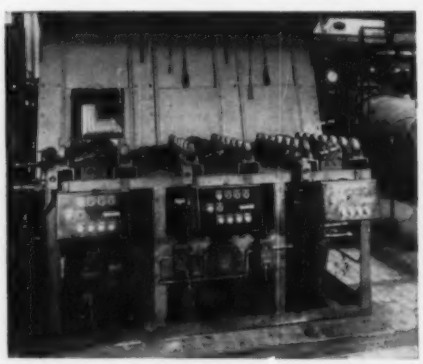
These are two of the three Lindberg gas-fired radiant tube carburizing and carbonitriding furnaces recently installed by an internationally known maker of farm machinery. With these furnaces 75% of parts are carbonitrided and 25% carburized. In addition, some bright annealing is done and the versatile Lindberg units can easily be converted for other heat treating applications.

Lindberg Vertical Radiant Tube Great Advance in Heat Treating Furnaces

When metal needs heat, Lindberg furnaces with the new Lindberg lightweight vertical radiant tube offer a better way to apply it. Industry the world over is finding that Lindberg furnaces with this new vertical tube provide a versatility no other type of furnace can give. Carbonitriding, carburizing, carbon restoration, bright hardening or annealing and normalizing are all possible with only minor adjustments.

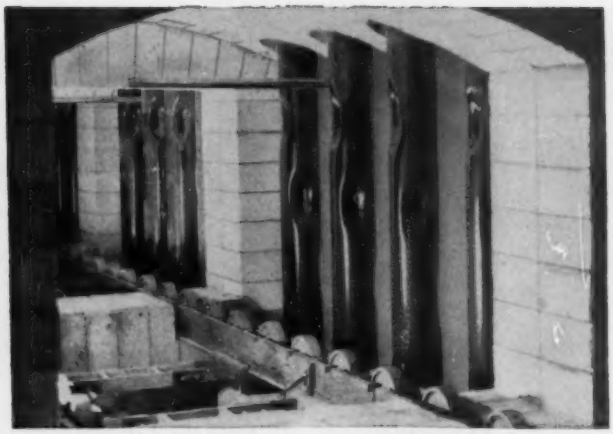
Here are some other exclusive advantages. Lindberg furnaces include a built-in pitless quench tank. Uniform case depth is assured because each charge automatically remains at heat the same length of time. A built-in purge chamber receives work loads for purging prior to heating.

Whatever type of furnace fits your production needs, from gigantic continuous pusher-type to the small manual batch-type furnace, Lindberg engineers can develop exactly the right equipment for you.



This three-row pusher Carburizer, with vertical radiant tubes between each row, was built for a large automobile manufacturer.

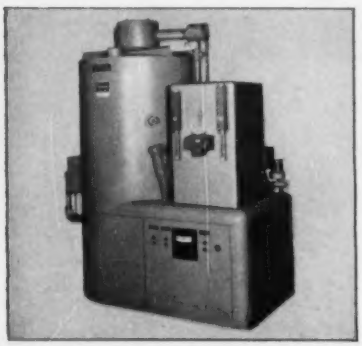
WITH LINDBERG RADIANT TUBES



Here you can see the unique "dimpled" design of the new Lindberg vertical radiant tube. Installation is a Lindberg continuous pusher-type gas-fired carbonitriding furnace.

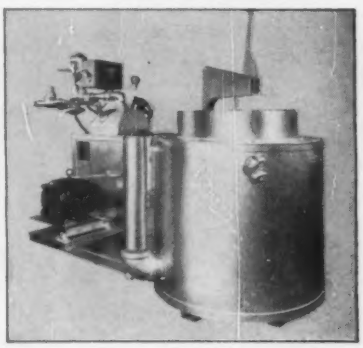
Revolutionary new development

The development by Lindberg of the lightweight, easily-changeable vertical radiant tube (patent pending) is one of the most significant improvements ever made in industrial furnace design. It eliminates the bulk and bend problems of the old-fashioned horizontal tube and the uneven heat patterns inherent in earlier vertical tubes. The secret lies in the new Lindberg tube's "dimples". Here's how they work—in the radiant tube a central stream of mixed air-and-gas is surrounded by a cylindrical stream of air alone and combustion occurs in the area between these two streams. The "dimples" create eddies in the streams accelerating combustion and maintaining even temperatures along the entire length of the tube. If you aren't fully familiar with this revolutionary development ask us, or your nearest Lindberg Field Engineer about it.



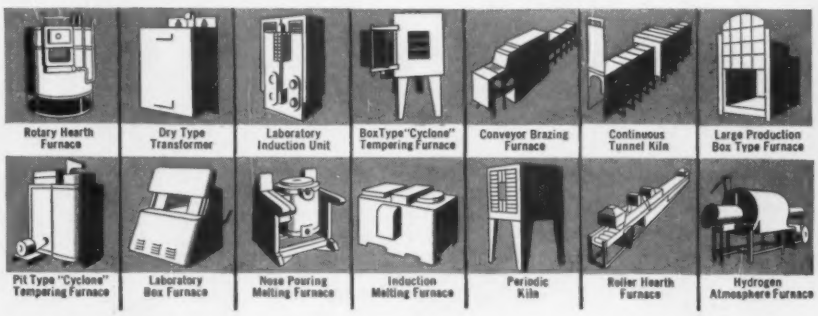
This newly-designed Lindberg Hyen generator is used with Lindberg radiant tube furnaces to supply the most exacting atmospheres needed for any heat treatment.

Here is the new Lindberg Carbotrol unit which automatically controls the carbon potential of furnace atmospheres provided by the Lindberg Hyen generator.



For the final step in heat treating, the famous Lindberg cyclone tempering furnace, for 20 years the standard of furnace performance. Pit or box type available.

Lindberg manufactures many kinds of equipment in the industrial heating and related fields. A few of these are symbolized here. If you are interested in any of these please write us for the specifics on them, or get in touch with your nearest Lindberg Field Engineer. (See your classified telephone book.)



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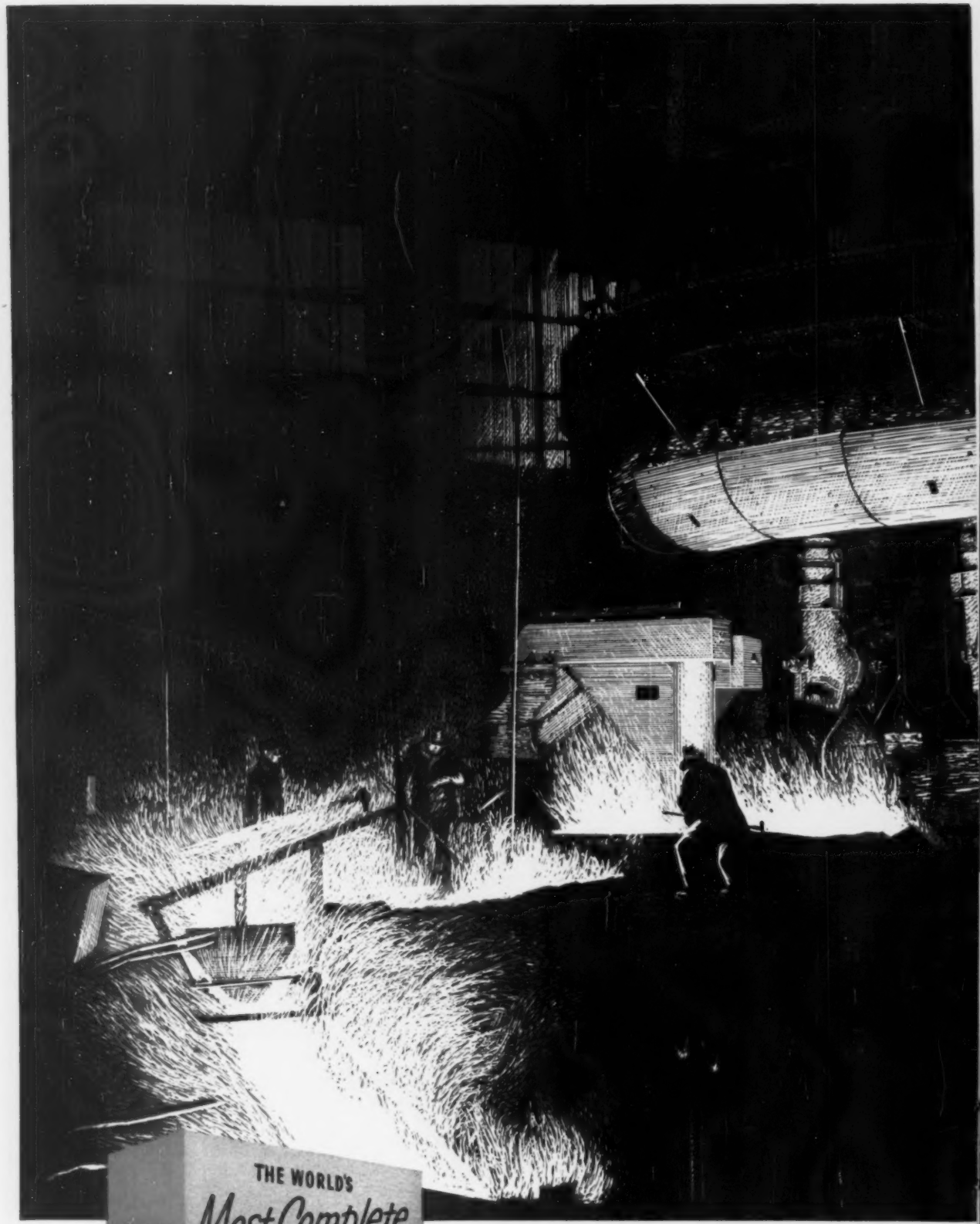
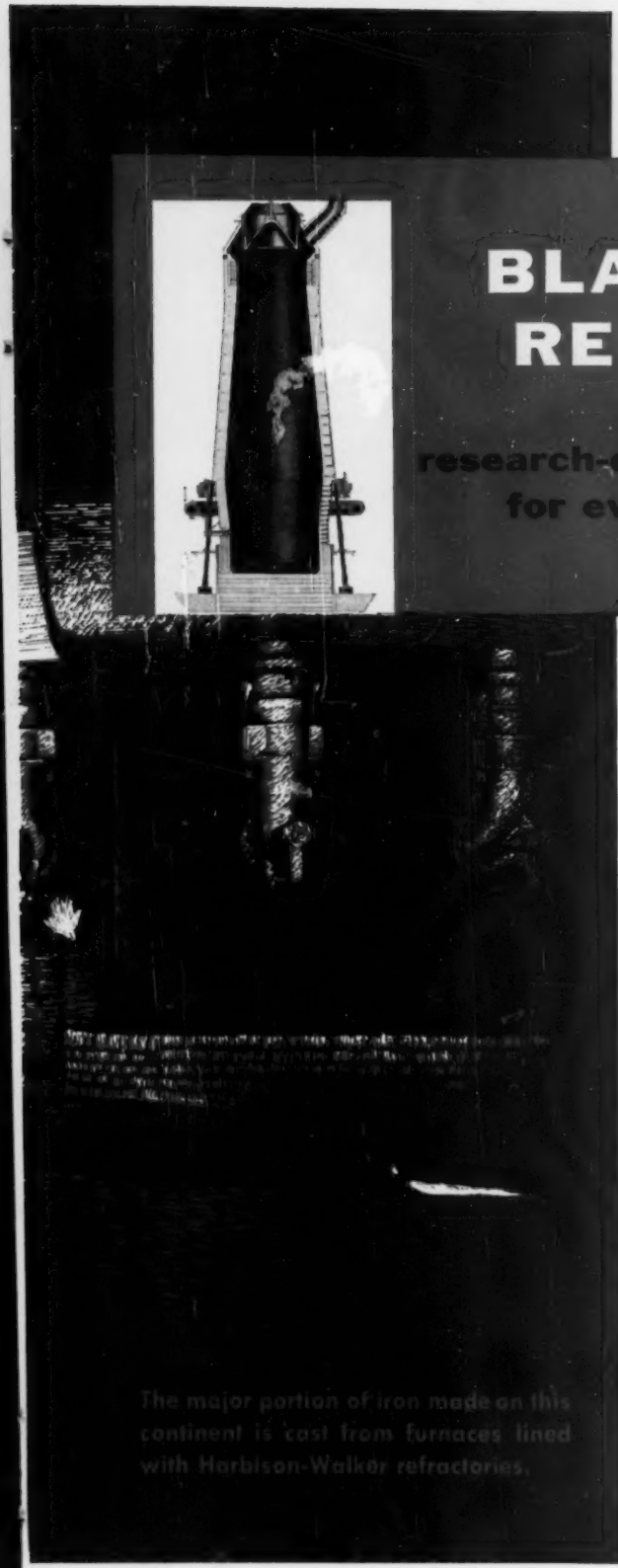
2452 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California • **Associate Companies:** Lindberg Industrial Corporation, Chicago • EFCO-Lindberg, Ltd., Montreal, Canada • Lindberg Italiana, Milan, Italy • The Electric Furnace Company, Ltd., Weybridge, Surrey, England • Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany



HARBISON-WALKER
AND SUBSIDIARIES

Harbison-Walker



BLAST FURNACE REFRACTORIES

specialized types
research-developed and service-proved
for every furnace requirement

The major portion of iron made on this continent is cast from furnaces lined with Harbison-Walker refractories.

The railroads were still pushing back the frontiers of America when Harbison-Walker manufactured its first blast furnace lining. During the years which have followed, the company has made the majority of all the blast furnace refractories used in the United States. Today there are more Harbison-Walker linings in service than all others.

The high standing of Harbison-Walker blast furnace refractories has been maintained through continuous product research and the continuous development of more precise methods of manufacture. Progress in blast furnace operation has demanded superior performance from refractories and Harbison-Walker refractories have kept abreast.

You are invited to consult Harbison-Walker regarding any of your refractories problems. The value of the company's recommendations is based upon its wide experience, its technical staff and its service records.

REFRACTORIES COMPANY

World's Largest Producer of Refractories • General Offices: Pittsburgh 22, Pennsylvania

ANOTHER EXAMPLE OF VICKERS® Hydraulics

LeBlond Automated Crank Turning Equipment completely turns and faces over 55 V8 crankshafts per hour. One operator can handle two such machines.

in AUTOMATION

This new LeBlond Automated Crank Turning Equipment machines crankshafts at an exceptionally high rate. All operations of the Models LBA and PBA machines shown above are hydraulic with the exception of the actual rotation of the crank . . . here a Vickers hydraulic motor is used for braking and jogging the electric motor drive. All hydraulic power is supplied by Vickers Pumps and controlled by Vickers Valves.

In addition to the advantages inherent in hydraulic control, Vickers Hydraulics gives you the benefits of a nation-wide and full-time field engineering and service organization to assure correct application and operation with least maintenance. Vickers has the complete line of hydraulic equipment necessary to take undivided system responsibility . . . to eliminate any risk of incompatibility of hydraulic components.

The Vickers Application Engineer near you will be glad to demonstrate the many benefits you can obtain by using Vickers Hydraulics. Write for a copy of Catalog 5001A.

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DIVISION OF SPERRY RAND CORPORATION

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7301

Representative Standard VICKERS Units Used on LeBlond Automated Crankshaft Lathe

Two-Pressure Balanced Vane Pump

"Hydrocushion" Type Sequence Valve

Pressure Reducing Valve

Solenoid Controlled Pilot Operated 4-Way Valve

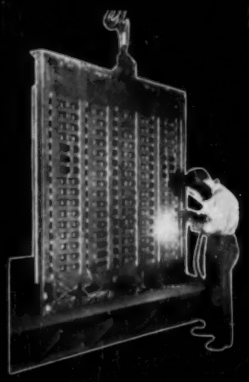
Flow Control Valve

Traverse and Feed Cycle Control Panel

Constant Displacement Piston Type Hydraulic Motor

"Compact" Hydraulic Cylinder

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921



WELDING SOLVES ANOTHER WEIGHT PROBLEM

(and USS "T-1" Steel solves the welding problem!)

Bedplates for modern color-printing presses have to be rugged—but as lightweight as possible. They must withstand constant pounding from printing rollers and cutting knives. And, since they move back and forth continually, they've got to be lightweight for fast, efficient operation. It is a good place to use a welded assembly of steel plate.

But that's where Graver Tank & Manufacturing Co., Inc., ran head-on into a tough fabrication problem. Alloy steel with the necessary strength and durability was difficult to weld. And with 534 welds to make on *every* bedplate, this was a king-size headache.

NO MORE HEADACHE!

Now the headache is gone. Production costs are down. And the finished bedplates are working hard and long . . . taking a tremendous daily pounding without distortion.

The solution? Just a switch to a remarkable *new* alloy steel, USS "T-1" Steel.

"T-1" Steel is very strong. Very tough. Able to take vicious impact abuse. Yet, it's easy to weld," says Mr. H. McDonald, Superintendent at Graver.

HOW ABOUT YOU?

If you have tough jobs, rugged jobs, where you want to weld your way to lower costs, give this new steel a try. We think you, like Mr. McDonald, will find it the best thing you have ever used. Right now, "T-1" is in service and doing well in bridges, power shovels, steam turbines, electrical transformer tanks, flywheels, pressure vessels, mine cars, and lots of other places. Write for details. United States Steel, Room 5089, Pittsburgh 30, Pa.

"TOP QUALITY" That's how Graver Tank & Manufacturing Co., Inc., East Chicago, Indiana, describes new USS "T-1" Steel. It gives them a yield strength of 90,000 psi . . . exceptional resistance to impact abuse . . . and good weldability. It enables them to build extremely rugged, all-welded bedplates for printing presses.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

6-15

UNITED STATES STEEL

"A Tough Job Today-
Routine Tomorrow"

says
R. O. Thomas
U. S. Steel's
Forging
Superintendent

THE PICTURE SHOWS the very heart of a horizontal extrusion press being built by the Loewy Construction Company for the Air Force heavy press program. It is the press container—forged, machined and assembled at the U.S. Steel Homestead Forgings Division.

It is the container which must sustain the high pressures exerted on the hot billet as it is forced through a die to form the extruded shape. In extruding an aluminum alloy, for example, the container itself is electrically heated to above the 800° F temperature of the billet—hot enough to soften ordinary steels.

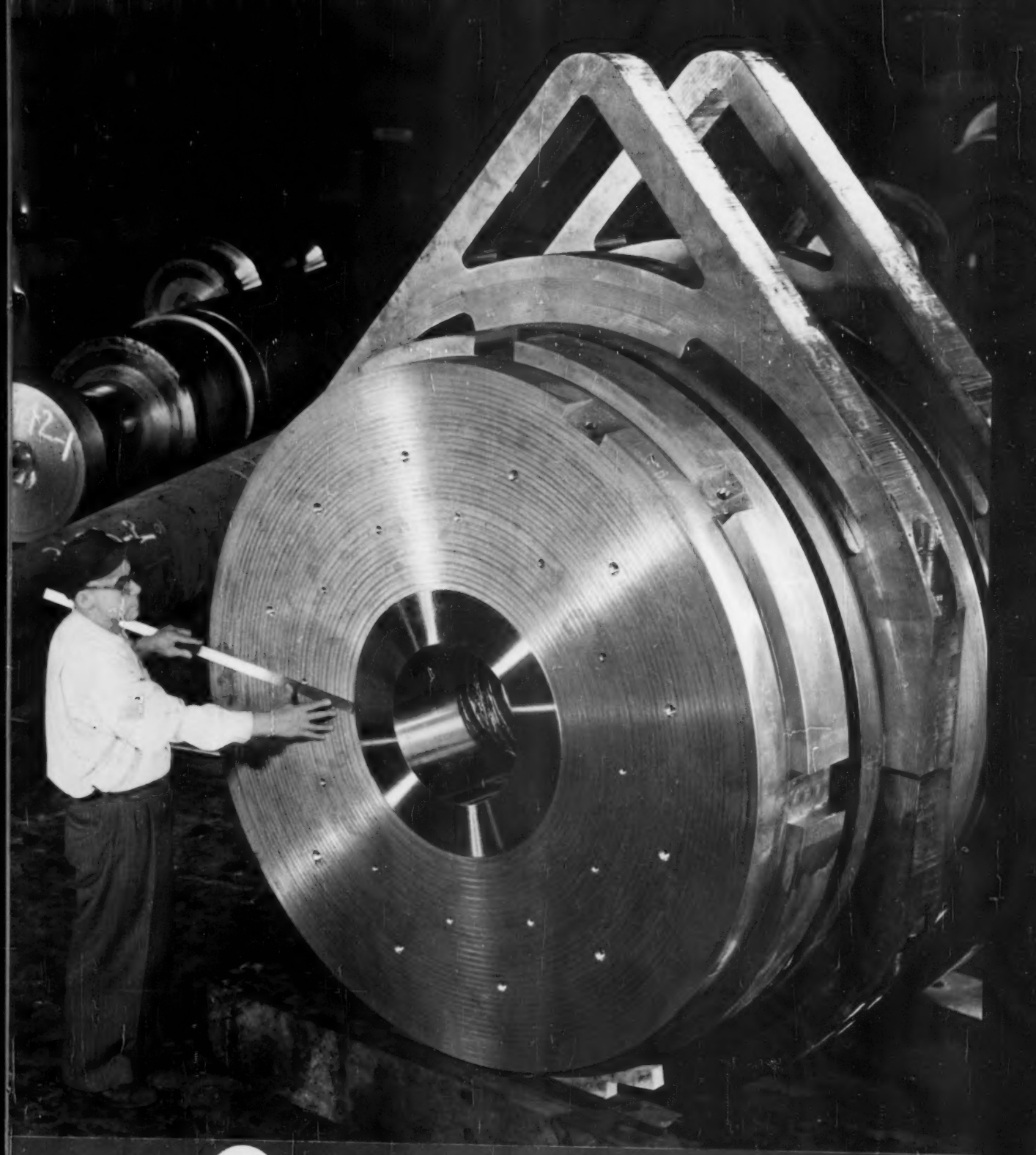
This container is made by shrinking together several steel sleeves, similar to the way big naval guns are constructed. The result is an extremely strong assembly without undue bulk, able to withstand the tremendous pressure exerted during extrusion. The liner (the highly polished inside part), primarily a heat resistant member, is forged from tungsten-chromium-molybdenum-steel, heat treated to a very high hardness to resist deformation. Over this liner is a heavy forged alloy steel liner holder. Next come five forged alloy steel rings that build the total outside diameter to over six feet.

When this press was first proposed, some segments of the industry felt that it would be most difficult, if not impossible, to meet the specifications. In answer, the first units have been shipped from the Homestead Forgings Division after passing all requirements . . . and more units are on the way.

If you would like a free copy of our 32-page booklet that gives the background of USS Quality Forgings, write to United States Steel, Room 5089, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your newspaper for time and station.

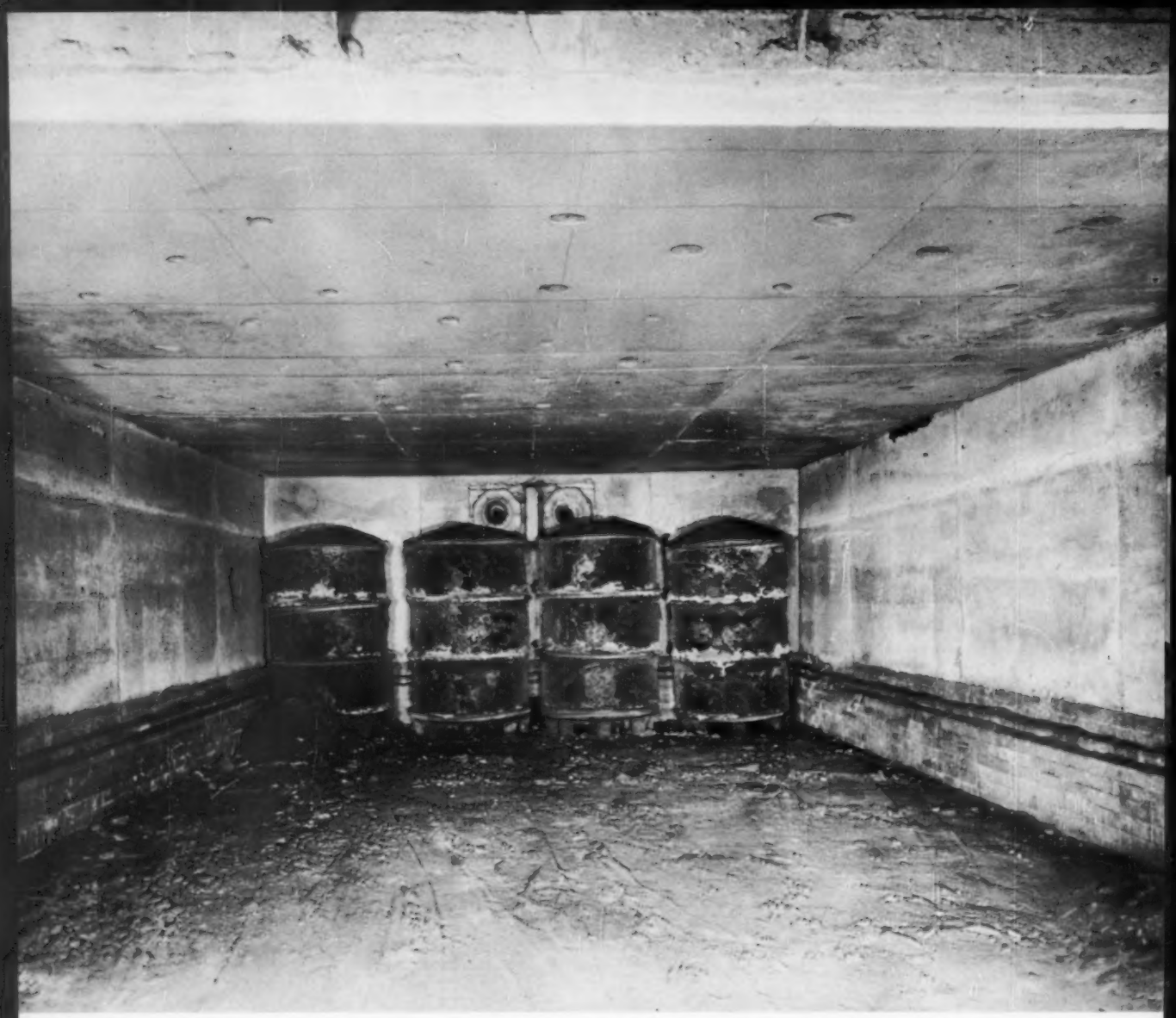
UNITED STATES STEEL



USS

Quality FORGINGS

- heavy machinery parts — carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns



SIDE WALLS AND FLAT ARCH ROOF on this batch-type annealing oven at Terre Haute Malleable & Mfg. Corporation, Terre Haute, Indiana, were installed quickly and economically with a castable refractory—Kast-O-Lite—a Lumnite-base castable manufactured by A. P. Green Fire Brick Company, Mexico, Mo.

CASTABLES: fast—economical—reliable

Lumnite-base castables are bringing new speed and economy to countless refractory installation and repair jobs. They're so easy to use. Just add water, mix, and you're ready to place refractory or insulating concrete.

Packaged castable mixes made with Lumnite* calcium-aluminate cement and selected aggregates are carefully proportioned to provide specific concretes to meet a wide range of temperature and insulation requirements. Because they are pre-mixed, such castables give quality results with added convenience. They are made and distributed by leading manufacturers of refractories.

Industrial concretes made with Lumnite cement or Lumnite-base castables have many uses—in forge plants and heat-treating shops, for annealing furnace car tops and roof arches, door linings, forge furnace arches; for furnace foundations, core ovens and many other installations. Write for detailed information.

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL CORPORATION SUBSIDIARY

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Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee
Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco

* "LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

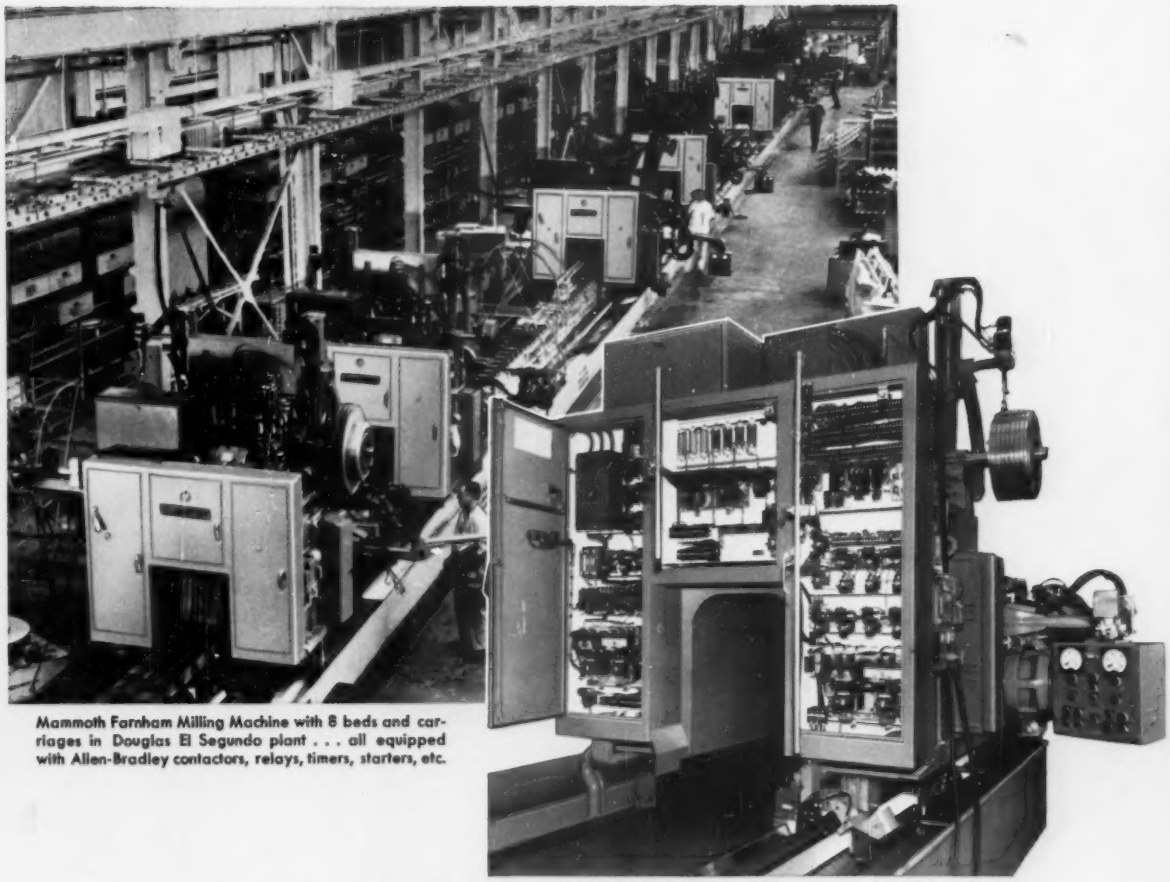
IA-L-116

Atlas® Lumnite Cement

FOR INDUSTRIAL CONCRETES

REFRACTORY • INSULATING • OVERNIGHT • CORROSION-RESISTANT

United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station.



Mammoth Farnham Milling Machine with 8 beds and carriages in Douglas El Segundo plant . . . all equipped with Allen-Bradley contactors, relays, timers, starters, etc.

308 FOOT MILLING MACHINE
. . . operated by Allen-Bradley Motor Controls

Solenoid starter Size 1

Solenoid starter Size 3

Auxiliary contacts on starter hood

Oiltight potentiometer control

Pendent push button control

Pneumatic automatic timer

Universal 4-pole relay

Oiltight push button. NO & NC contacts

Interlocking terminal blocks

Oiltight limit switch—all types

When the Farnham Manufacturing Division of The Wiesner-Rapp Co., of Buffalo, N.Y. built this impressive, 308 foot milling machine, they used Allen-Bradley control components for all 8 carriages. Thus, they assured themselves and Douglas of utmost reliability for this complex machine tool.

If you manufacture motor-driven machines, don't overlook the fact that Allen-Bradley motor controls are a big sales asset to any machine. The A-B trademark is a guarantee of trouble free performance . . . and is so recognized by machine tool buyers. Did you notice how much in evidence this trademark was at the Chicago Machine Tool Show?

Send for the Allen-Bradley Handy Catalog. It is a valuable handbook on modern motor control. Write today.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

A-B Quality

ALLEN-BRADLEY
QUALITY

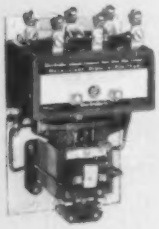
SPECIAL PANELS

1-58-8

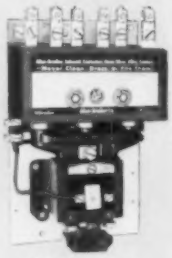
ALLEN-BRADLEY
A-C CONTACTORS

2 pole—Size 00
10 ampere

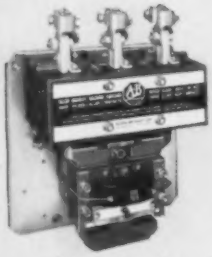
3 pole—Size 1
25 ampere



3 pole—Size 2
50 ampere

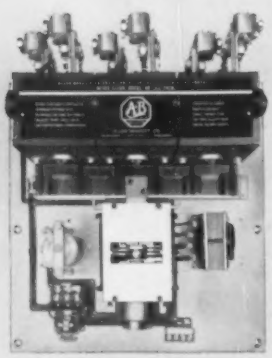


3 pole—Size 3
100 ampere

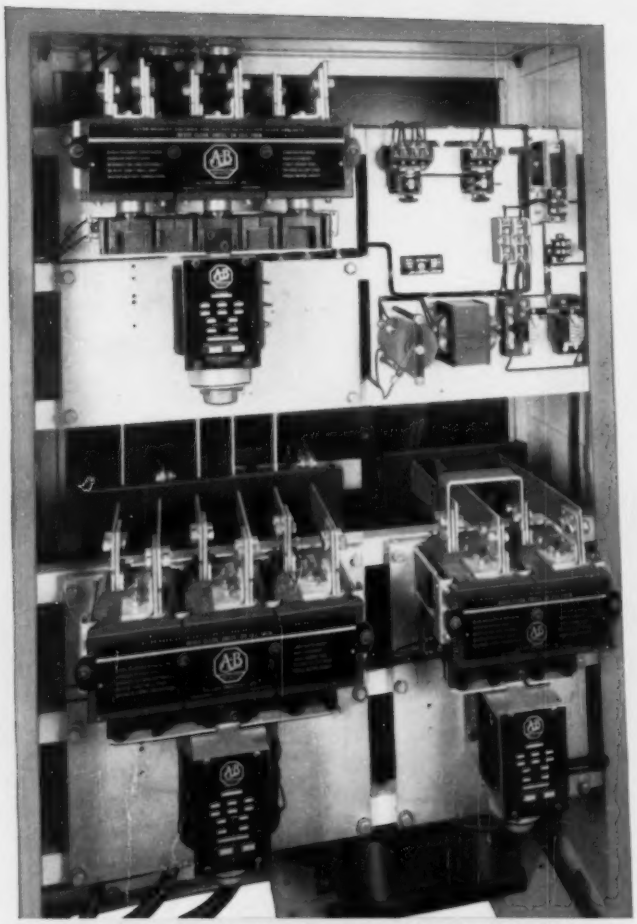


3 pole—Size 4
150 ampere

3 pole—Size 5
300 ampere



3 pole—Sizes 6 & 7
600 & 900 ampere contactors



250 Hp, Bulletin 746 automatic autotransformer showing Allen-Bradley Size 7 contactors

A-C and D-C CONTACTORS

10 to 900 Amperes

with Double Break, Silver Alloy Contacts

The only complete line of solenoid contactors on the market. Allen-Bradley offers nine sizes...from Size 00 (10 amperes) to Size 7 (900 amperes), one to four poles.

There is no contact maintenance . . . no pins, pivots, or bearings to give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent for all nine sizes.

Enclosures can be supplied for general purpose, water-tight, dust-tight, and explosion-proof service.

Allen-Bradley controls are an added sales asset to any machine. May we send you our catalog?

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

A-B Quality

ALLEN-BRADLEY
SOLENOID CONTACTORS
QUALITY

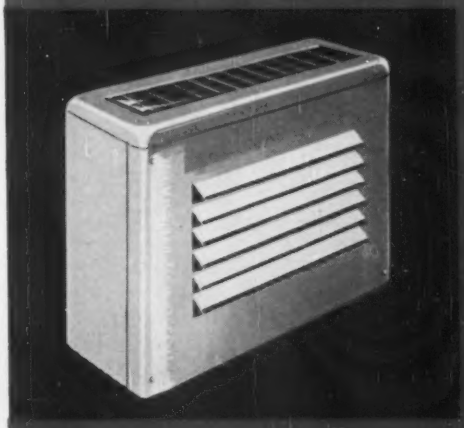
1-56-MR

Why deep draws with

Weirzin

electrolytic zinc-coated sheets

provide important manufacturing economies



Because Weirzin has been proved to retain its amazingly uniform protective coating under extreme fabricating operations, it is specified by leading manufacturers for a wide variety of products.

Drawing and forming are performed rapidly, with complete absence of flaking, cracking, or peeling. Inventory losses due to rust are materially reduced. Heat and moisture are successfully resisted. Absence of underfilm corrosion assures not only longer life, but also adherence of paint, lacquer, enamel and lithograph ink. And, for even longer adhesion, chemically treated Weirzin is available.

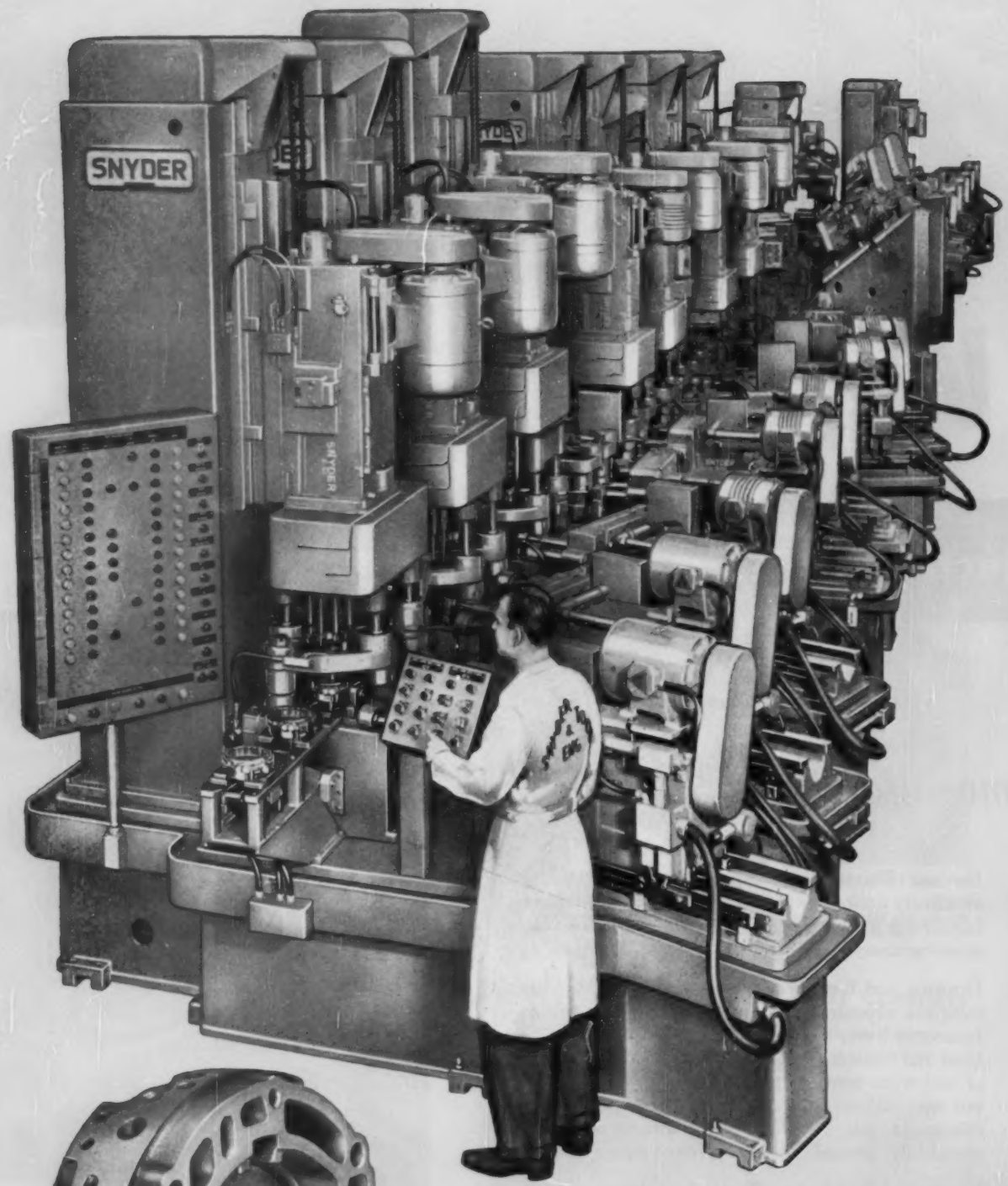
When the job calls for difficult deep draws, specify Weirzin and enjoy the double advantage of quality and economy.

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

WEIRTON STEEL COMPANY



An individual station is provided for ejecting parts when the first section of the machine is operating and the second section is down for tool changes. Also shown is the turnover mechanism which turns the part through 180 degrees for operations on the other side. →

SNYDER SEGMENTED AUTOMATION in 23 segment, 75 station, in-line, transfer machine permits part design flexibility, conversion to processing similar parts, limited obsolescence; drills, reams, spotfaces, chamfers, bores, counterbores, mills, taps, and automatically air gages work on automatic transmission front oil pump bodies at 144 pieces an hour at 80% efficiency.

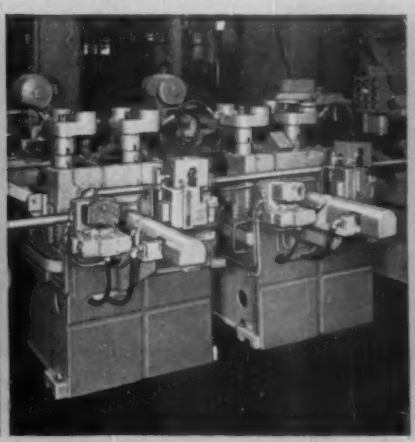
SNYDER

TOOL & ENGINEERING COMPANY

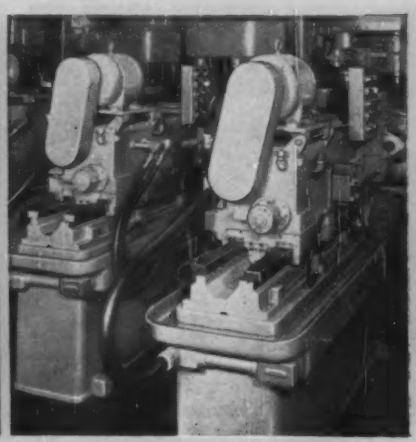
3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

31 Years of Special Machine Tools with Automation

Segment bases are designed for mounting units for future operations, a feature of the flexibility and convertibility of the machine.



Each segment has individual push button station. Note the accessibility of tools.



TEAMWORK of large and small business is responsible for the present prosperity of both. Here, owners Frank, George and Harmon Hugo (left to right) check vital jet engine part with Arnold Armstrong before delivery to General Electric Plant at Evendale, Ohio.

SPECIALLY BUILT OVEN at Portland Copper raises temperatures as high as 2400°—one of many metal treating facilities available at Portland plant.

QUALITY CONTROL has been a major factor in building the firm's reputation. Here, Albert Kozick checks X-ray of special weld for flaws —standard procedure on all jet engine work.

DIVERSITY OF OPERATION—now over 40% non-defense—is typified by new, fabricated aluminum toll booth doors ordered for new Maine Turnpike.

SKILLS LEARNED AS A G-E DEFENSE SUBCONTRACTOR PROVE VALUABLE TO OTHER INDUSTRIES

Portland Copper's success story underlines interdependence of large and small business

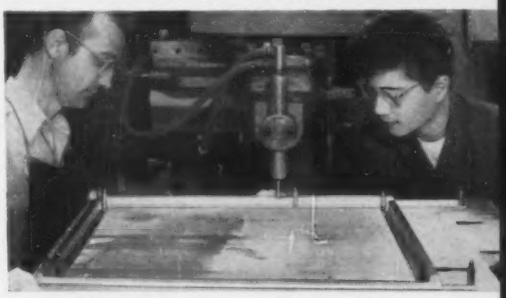
The Portland Copper & Tank Works, Inc., like many small businesses, started with virtually nothing but the personal skills of its owner—in this case a coppersmith who had left Russia in 1909 to seek greater opportunities in the United States. Morris Hugo opened a tiny metal-working plant which existed precariously—with a top gross of only $12,000—until World War II. Then, with ship repair work for the Navy and the U. S. Maritime Commission in 1943, yearly sales abruptly soared to $250,000.

Defense skills developed. After the war the company moved to larger quarters in South Portland, Maine, and built up its reputation as a fabricator of stainless steel, aluminum, and special high-temperature alloys. General Electric entered the picture in 1949 with an order for afterburners for J47 jet engines.

Big business helps small business. The Maine firm quickly proved its ability in precision manufacture, made prompt deliveries. And G.E., well-satisfied with the work, soon became Portland Copper's largest customer. As one of more than 17,000 G-E subcontractors and suppliers in the past 5 years, the Portland firm has *continued* to expand in other non-defense areas: pulp, paper, textiles, chemical and petroleum industries. It now grosses better than $5,000,000 annually, reports an employee roster of 423—as compared with 100 in 1949.

Contributes to nation's production. This success story dramatizes once more the interdependence of large and small business—and how such a system operates for the benefit of both. General Electric has gained essential services and jet engine components needed to help build up the nation's defense. Portland has acquired new skills and facilities which now make the firm valuable to other manufacturers in our expanding national economy. 649-5

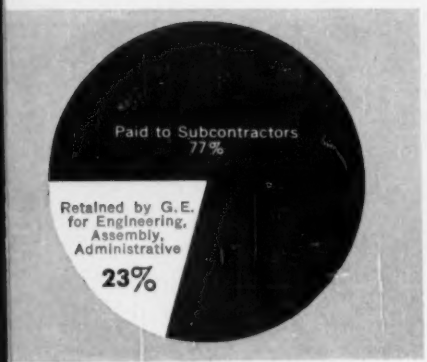
INTRICATE FABRICATION is one of more difficult operations Portland performs successfully. Here R. L. Clark checks stainless steel section of a powerful G-E gas turbine.



NEW SKILLS learned as a G-E defense subcontractor are now applied to a variety of jobs for other manufacturers. Typical is this precision welding by Portland Copper and Tank personnel on aluminum panel assembly.

Progress Is Our Most Important Product

GENERAL ELECTRIC



SUBCONTRACTORS who helped G.E. build the J47-GE-25 during the Korean War got 77 cents of every dollar government paid General Electric for engine.

Can Small Business Help You?

Thousands of small businesses, like Portland Copper and Tank, have furnished General Electric with practically every kind of skill and service as defense subcontractors and suppliers.

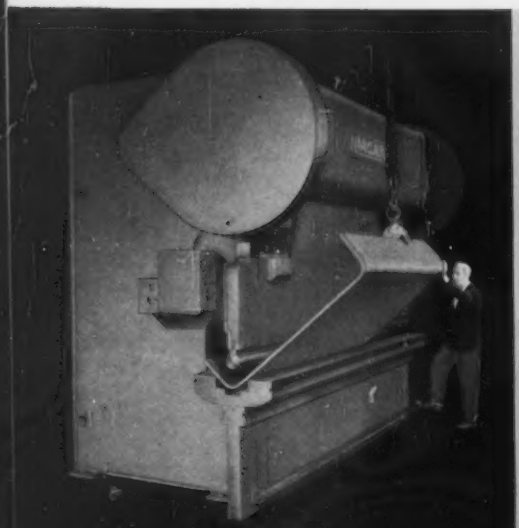
Many of these companies have available production capacity, created in large part by the reduction of defense orders since the Korean War peak. This means that they may be able to apply their skills to help you with your production.

If you have a manufacturing problem or have work available for subcontracting, please write us on your letterhead stating in as much detail as possible the type of services or skills you require. We will be glad to suggest several small businesses who have done similar work for us and may be able to help you.

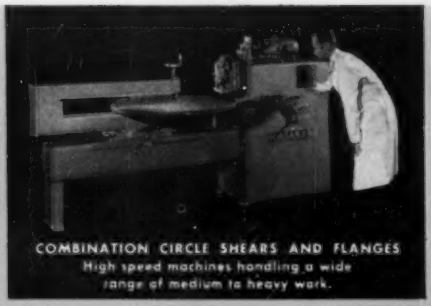
Write to C. W. Bryant, Manufacturing Services Division, General Electric Co., 570 Lexington Ave., New York 22, N. Y.

In plate or sheet metalworking...

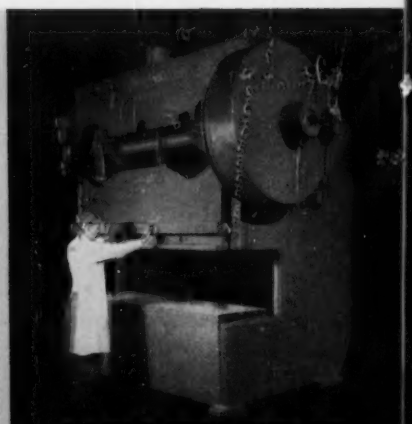
NIAGARA MACHINES CAN



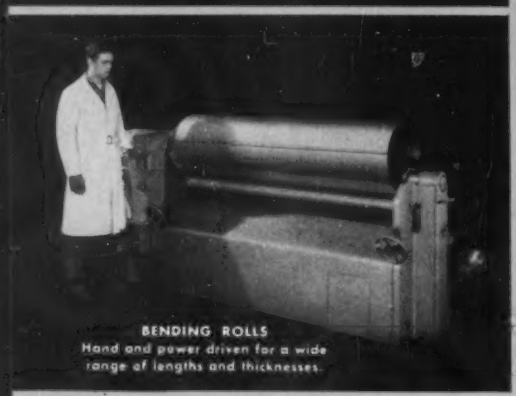
PRESS BRAKES.
50 - 775 ton capacities.



COMBINATION CIRCLE SHEARS AND FLANGES
High speed machines handling a wide range of medium to heavy work.

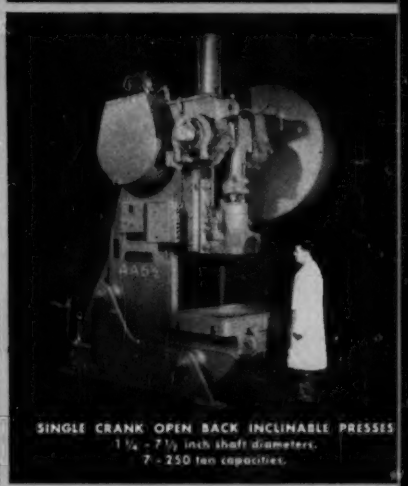


GAP FRAME DOUBLE CRANK PRESSES
3 - 6½ inch shaft diameters.
48 - 222 ton capacities. Also, inclinable series.



BENDING ROLLS
Hand and power driven for a wide range of lengths and thicknesses.

STRAIGHT SIDE DOUBLE CRANK PRESSES
50 - 300 ton capacities.



SINGLE CRANK OPEN BACK INCLINABLE PRESSES
1¼ - 7½ inch shaft diameters.
7 - 250 ton capacities.

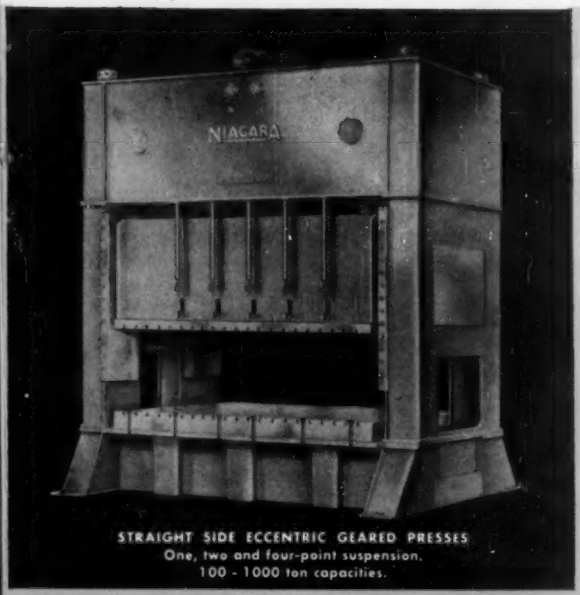
STRAIGHT SIDE ECCENTRIC GEARED PRESSES MODIFIED AND EQUIPPED FOR AUTOMATION
1, 2 and 4 point suspension.
100-1000 tons.

FRONT-TO-BACK CRANKSHAFT OPEN BACK INCLINABLE PRESSES
Standard and automation models
75-200 tons.

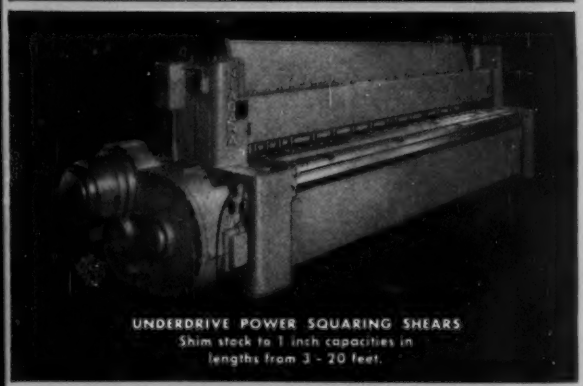
FRONT-TO-BACK CRANKSHAFT ADJUSTABLE BED PRESSES
Standard and modified models.
22-150 tons.

FRONT-TO-BACK CRANKSHAFT DEEP THROAT PRESSES
22-150 ton capacities

❋ DO THE MOST FOR YOU



STRAIGHT SIDE ECCENTRIC GEARED PRESSES
One, two and four-point suspension.
100 - 1000 ton capacities.



UNDERDRIVE POWER SQUARING SHEARS
Shim stock to 1 inch capacities in
lengths from 3 - 20 feet.

❋ MOST EXTENSIVE LINE:

From giant, power-operated machinery to small hand tools

❋ MOST ADVANCED DESIGNS:

Years ahead in performance through forward-thinking engineering

In the world's largest automotive and appliance plants or the smallest of sheet metal shops, Niagara machines and tools are usually at work "in force."

Batteries of giant presses are teamed up with speedy ring and circle shears. Massive, rugged press brakes stand side-by-side with powerful bending rolls and squaring shears. Versatile lever punches, rotary machines, groovers and seamers . . . all operate together to produce a better product at lower cost. The Niagara lines are "companion lines" of metalworking machines and tools that work together. A Niagara-equipped shop or plant is years ahead in quality and volume of production.

Whatever you require — power presses or hand tools — Niagara is the line that can do the most for you. It is the most complete in the industry . . . the most advanced in engineering. You can consult a Niagara representative with complete confidence of unbiased recommendations. Niagara has the right machines and tools for your requirements.

NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

POWER PRESSES • PRESS BRAKES • POWER SQUARING SHEARS • ROTARY MACHINES • SLIP ROLL FORMERS • POWER ROTARY SHEARS • DRUM MAKING EQUIPMENT • ELECTRONIC AUTOMATIC WELDERS • GROOVERS AND SEAMERS • HAND OR FOOT OPERATED SHEARS • FOLDERS-BRAKES • LEVER SHEARS AND PUNCHES • HAND TOOLS

BRING YOUR FILES UP-TO-DATE WITH INFORMATIVE NIAGARA BULLETINS

A diversified and extensive list of machines and tools make up the famous Niagara line. Some of the principal types are illustrated. Be sure that you have the latest data on the ones that apply to your work. At your request, specific Bulletins will be mailed promptly.

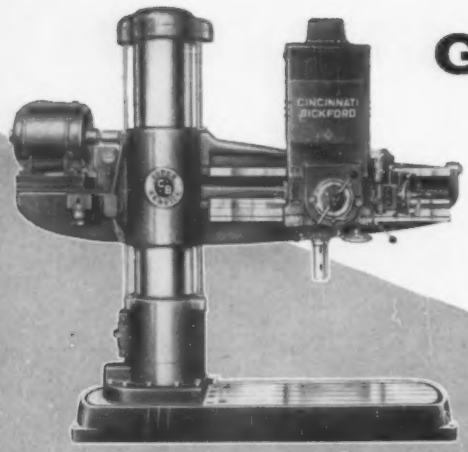
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES:

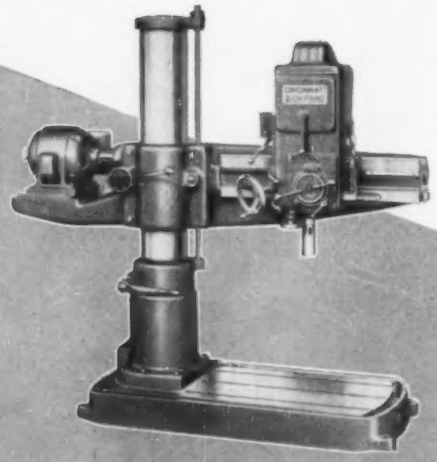
Buffalo • Cleveland • Detroit • New York • Philadelphia

Dealers in principal U. S. cities and major foreign countries

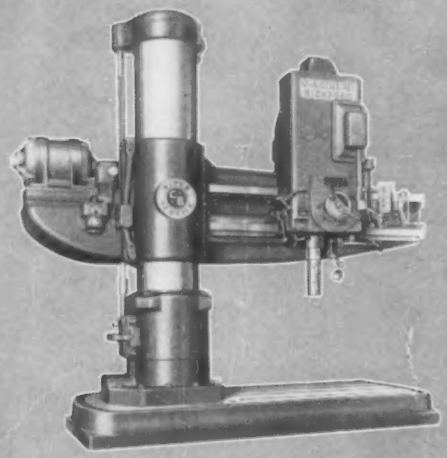
Get "Super Service" a CINCINNATI



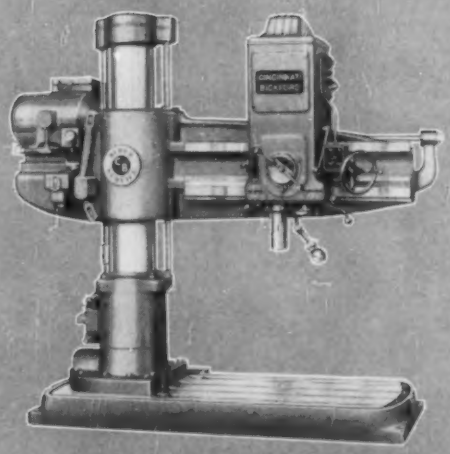
New design 3′ to 8′ Super Service Radials, 11″ to 19″ diameter columns with hydraulic speed range pre-selector. Write for Bulletin R-32.



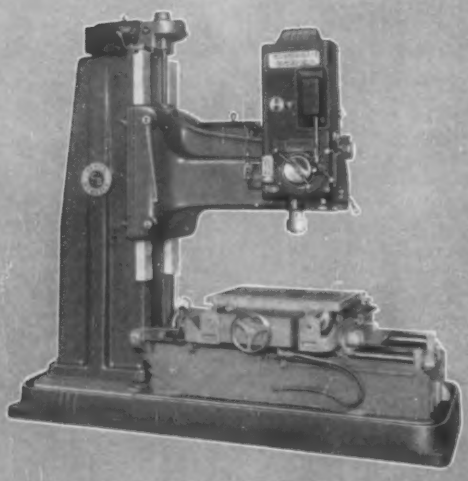
3′ and 4′ arm, 9″ column, 3 HP Super Service Radials for fast easy handling. Write for Circular R-21C.



Super-Service Radials with lever shifts for 36 speeds and 18 feeds, 3′ 11″ to 8′ 19″ sizes. Ask for Booklet R-29.



New 12 speed head, 5 HP, 3′, 4′ and 5′ Super Service Radials with 9″ or 11″ column—many advanced features. Ask for Bulletin R-31.



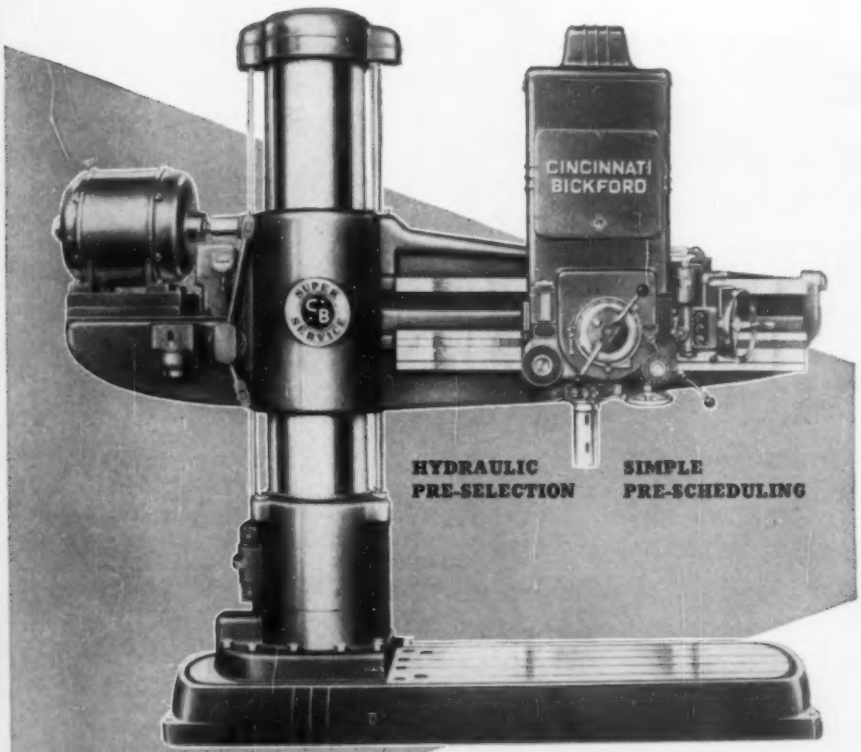
Super-Service Precision Drilling Machine used with spacing table, for interchangeable production without jigs—Bulletin FH-2.

CINCINNATI BICKFORD

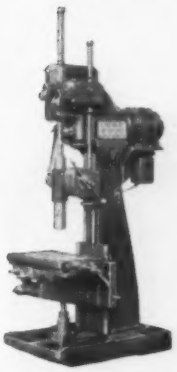
in your shop with

BICKFORD . . .

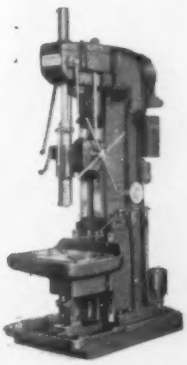
This complete Super Service line of radial and upright drills offers a wide opportunity for profitable selection to fit your individual needs. These latest designs in modern drilling machines for economical production are backed by 81 years of leadership in the metal drilling field.



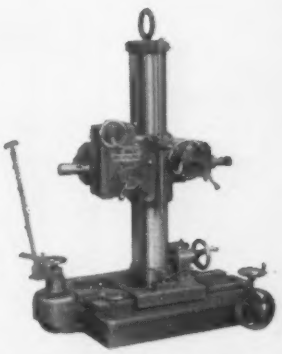
Two convenient easy to read dials control hydraulic pre-selection of all 36 speeds and 18 feeds. Pre-scheduling of operations (with a permanent record) is simple and quick. 4′ 13″ to 8′ 19″ sizes—Booklet R-33.



21″, 24″ and 28″ sizes, 3 HP to 7½ HP, general purpose Upright Drills, round or box column. Ask for Booklet U-25-B.



Production type Direct Drive Uprights, 21″, 24″ and 28″ sizes are engineered to suit your job; 3 HP to 10 HP. Write for Booklet U-27.



Portable Horizontal Drill, 1½ HP. Easily moved to the job. Spindle adjusts vertically and thru 360° in horizontal plane.

SUPER SERVICE **RADIAL AND UPRIGHT DRILLING MACHINES**

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Subsidiary of GIDDINGS & LEWIS MACHINE TOOL CO., Fond Du Lac, Wisconsin

TISHOLT

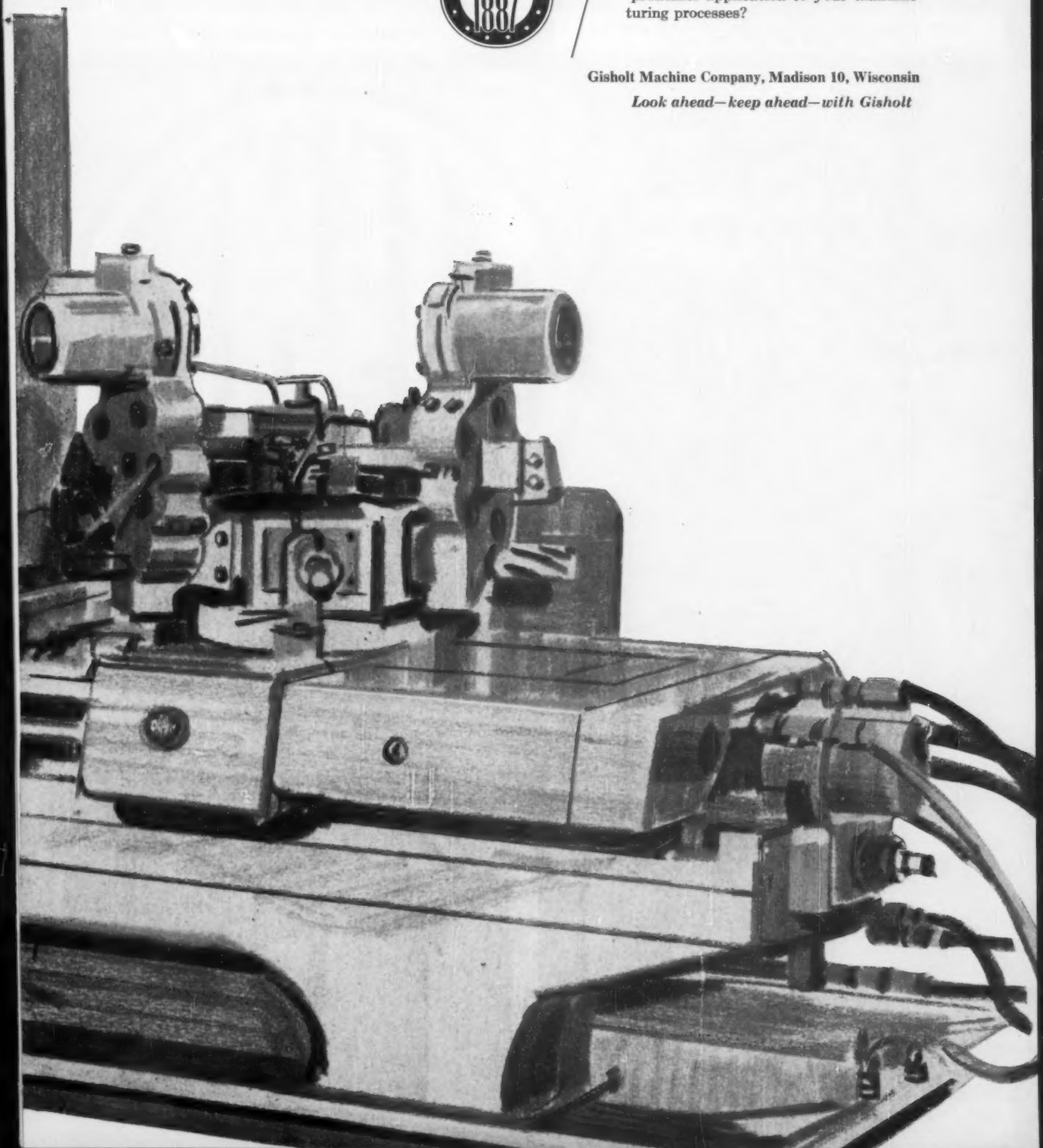
GISHOLT MASTERLINE FASTERMATIC AUTOMATIC TURRET LATHE

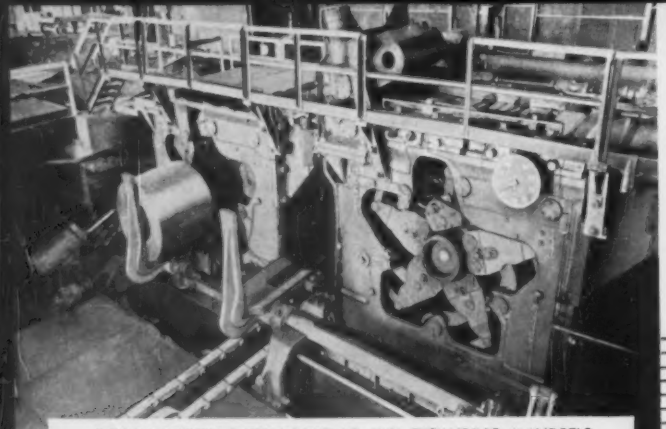
MASTERLINE GISHOLT SINCE 1887

This latest design Gisholt MASTERLINE Fastermatic Automatic Turret Lathe offers many outstanding features which give you faster, easier operation, higher quality work, quicker setup and lower maintenance. In short, this machine will do your work faster and better at less cost —and with a new minimum requirement for operator skill, effort and attention. May we give you more facts about its profitable application to your manufacturing processes?

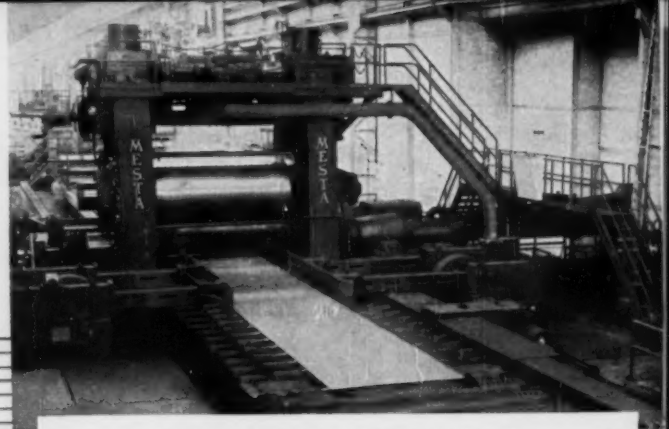
Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt





DOWN COILERS WITH ROTATING AND EXPANDING MANDRELS ON A MESTA 60" HOT STRIP MILL

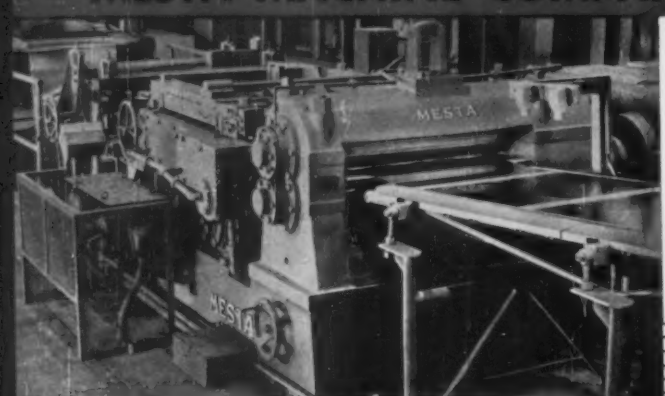


MESTA 132" FOUR-HIGH REVERSING PLATE MILL

DESIGNERS and BUILDERS of Complete STEEL PLANTS

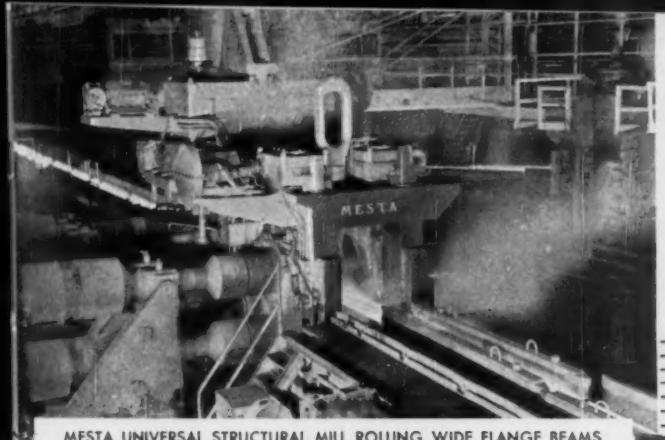
MESTA

MESTA MACHINE COMPANY, PITTSBURGH, PENNSYLVANIA



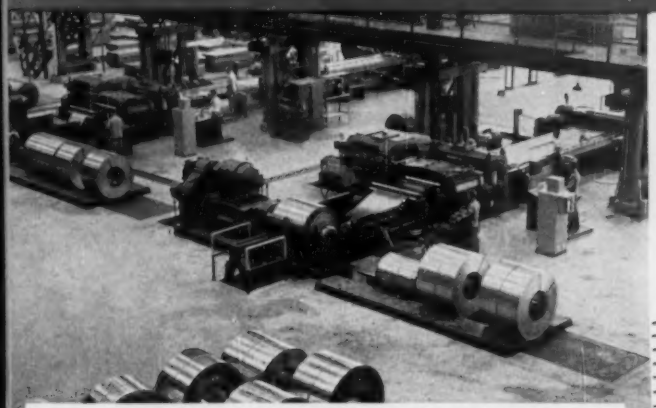
MESTA 42" ROTARY FLYING SHEAR AND LEVELLER SHEARING TIN PLATE AT 1,200 FT. PER MINUTE ON AN ELECTROLYTIC TINNING LINE

MESTA 46" TWO-HIGH REVERSING SLABBING-BLOOMING MILL WITH MANIPULATORS AND TABLES

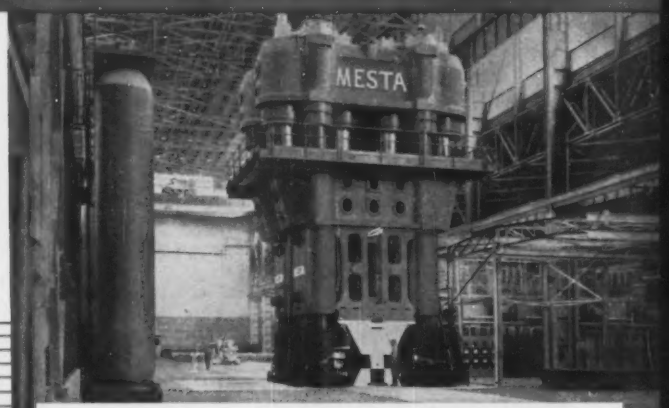


MESTA UNIVERSAL STRUCTURAL MILL ROLLING WIDE FLANGE BEAMS
ON THE 44" UNIVERSAL STAND AND 34" EDGING STAND

SIX FINISHING STANDS OF THE
MESTA 60" FOUR-HIGH HOT STRIP MILL



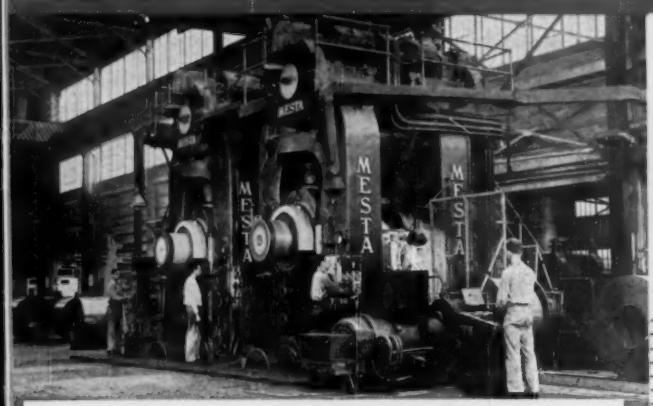
MESTA 60" SHEET SHEARING LINES WITH TRIMMERS AND
COMBINATION ROTARY FLYING SHEARS AND LEVELLERS



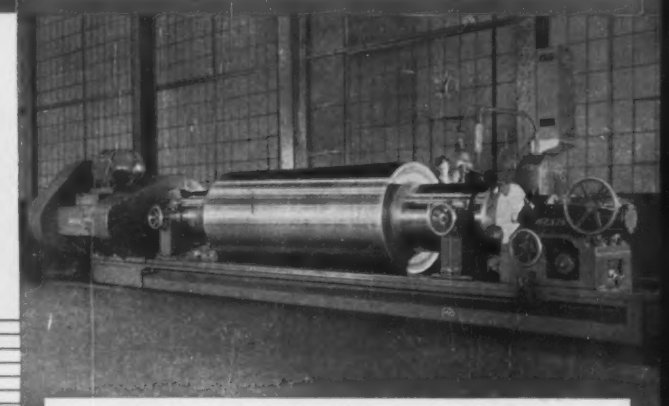
MESTA 50,000-TON HYDRAULIC FORGING PRESS

MESTA 60" CONTINUOUS PICKLING LINES

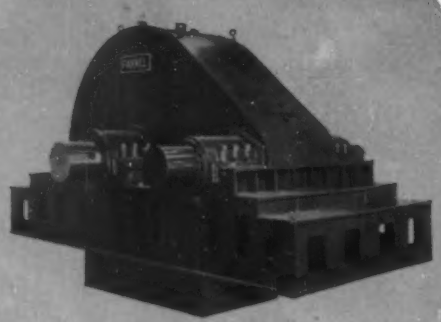
MESTA 56" FOUR-HIGH FOUR-STAND TANDEM COLD MILL



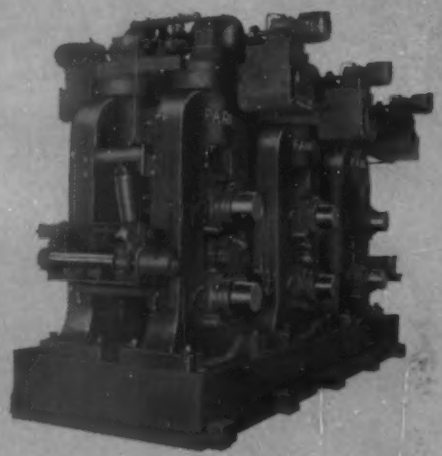
MESTA 42" FOUR-HIGH TWIN-STAND SKIN PASS MILL



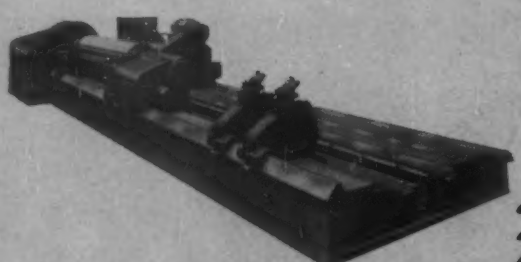
MESTA HEAVY-DUTY TRAVELING WHEEL TYPE ROLL GRINDER
FINISHING A 59" X 154" MESTA BACKING-UP ROLL



5500 HP Herringbone geared reduction unit designed to transmit power to a 134" three-high, sheared plate mill.



4½" and 14⅜" x 16" four-high, three-stand tandem mill for rolling nonferrous strip.



Farrel heavy-duty roll grinder.

℞

FOR ROLLING MILL HEADACHES

ROLLING MILLS — For almost a century, Farrel mills have been helping to solve rolling mill production problems. They are built in a wide range of types and sizes for rolling nonferrous rods, strips or sheets, metal foils and cold strip steel. Farrel also designs and manufactures coilers and special handling equipment required to make each installation a complete production unit.

MILL DRIVES — Specially designed to suit individual requirements, Farrel reduction gear drives, pinion stands and combination units are built in any size for any capacity. Combination units have the reduction gears and mill pinions in a compact, integral housing.

ROLL GRINDERS—Available in two types and nine standard sizes, Farrel roll grinders enable you to fix and maintain definite standards of accuracy and finish. Rolls are produced with a flawless surface, free from marks of any kind, ground straight, or with concave or convex contours of exact symmetry and accuracy.

Information and engineering consultation available, without obligation.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Fayetteville (N. C.), Los Angeles, Houston

FARREL® ROLLING MILL MACHINERY

Rolls • Rolling Mills • Slab, Rod and Coil Handling Equipment • Universal Mill Spindles • Rod Coilers • Slitters • Gears • Mill Pinions • Pinion Stands • Gear Drives of Any Capacity • Flexible Couplings • Roll Grinding Machines • Roll Calipers

Farrel-Birmingham®

FB-1053

"Here's why we use Harvey Aluminum extrusions in our industrial slides"

Once the manufacturer of this electronic drawer slide machined the three parts from solid bar stock. Now, he uses three *custom designed* Aluminum Extrusions supplied by Harvey Aluminum. They require no machining and need only cutting to length and drilling before final assembly. Production time, scrap loss, handling and over-all costs were all sharply reduced . . . and the product is better, in the bargain. Countless other designs have been simplified and made more profitable by Harvey Aluminum Extrusions. Learn how they can help your own product; send *today* for our brochure, "Aluminum Extrusions."

Harvey is a leading independent producer of aluminum extrusions in all alloys and all sizes, special extrusions, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tube, impact extrusions, aluminum screw machine products and related products. Also similar products in alloy steel and titanium on application.

Making the most of aluminum ...for everyone

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC.
TORRANCE, CALIFORNIA
Branches in principal cities

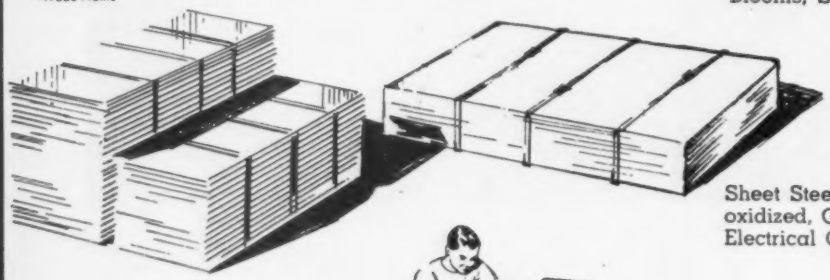
SHARON STEEL

ROEMER WORKS — Farrell, Pennsylvania
Steel Manufacturing Division: Pig Iron, Open Hearth Ingots, Blooms, Slabs, Billets, Sheet Bar and Plates. Finishing Division: Carbon, Alloy and Stainless Hot and Cold Rolled Strip Steel, Black, Pickled and Coated Strip Steel, Sharon Galvanite* Sharonart, Special Alloy Coated, N. A. X. and Cor-Ten Strip Steels.

*Trade Name

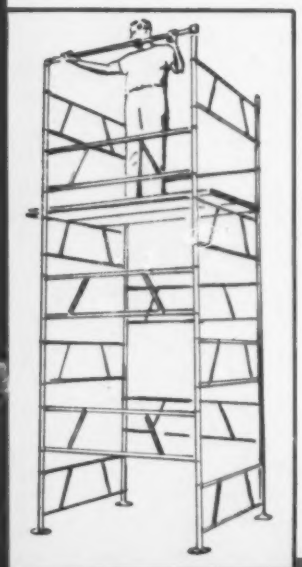
SPECIAL STEELS

LOWELLVILLE WORKS — Lowellville, Ohio
Pig Iron, Open Hearth and Electric Furnace Ingots, Blooms, Slabs, Sheet Bar, Billets and Plates.



SHEETS

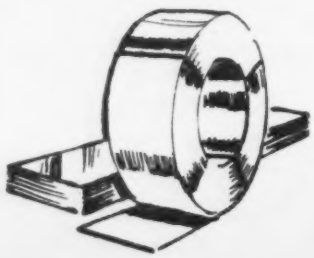
Sheet Steel — Hot Rolled, Pickled, Annealed, Deoxidized, Galvanized, Galvanite, Long Terne and Electrical Grades.



STEEL STRAPPING

BUILDING PRODUCTS

BRAINARD STEEL DIVISION — Warren, Ohio
Tensional Steel Strapping, Heavy Duty Strapping, Strapping Tools and Accessories, Electric Welded Steel Tubing, Tel-O-Posts, Steel Strong Posts, Brite-Lite and Standard Areawalls, Roll-Formed Steel Lintels, Anti-Checking Irons, Brainard Scaffolding.



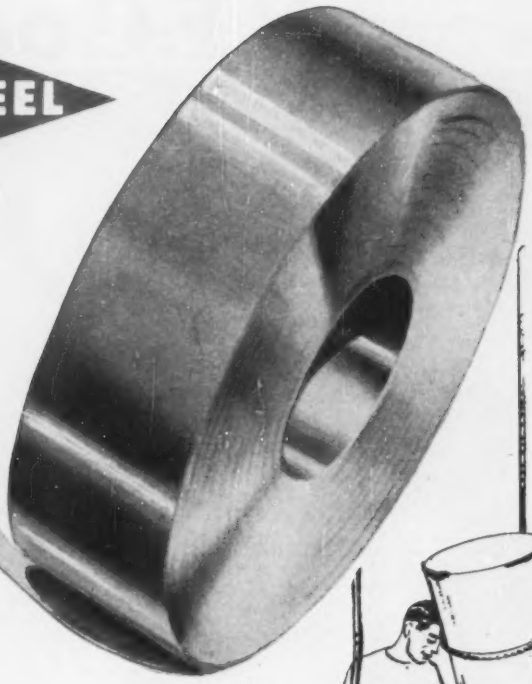
STRIP STEEL

DETROIT TUBE & STEEL DIVISION
Detroit, Michigan
Cold Rolled Strip Steel, Low Carbon — High Carbon, N. A. X. and Cor-Ten Strip Steel.

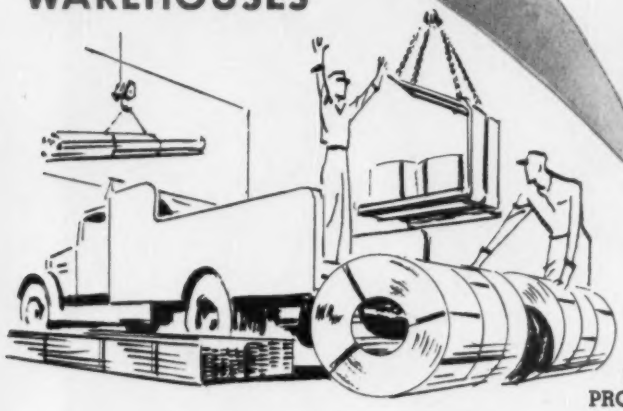
SHARON STEEL CORPORATION
Sharon, Pennsylvania

SHARONSTEEL

STEEL

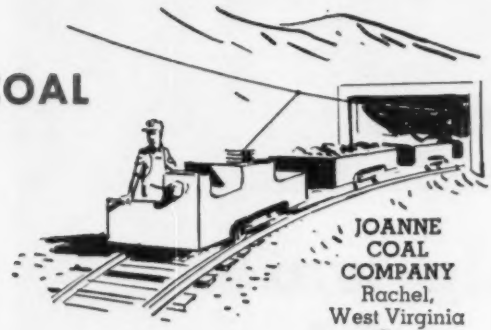


WAREHOUSES



SHARONSTEEL
PRODUCTS DIVISION
Farrell, Pennsylvania
Warehouse Distributors.

COAL



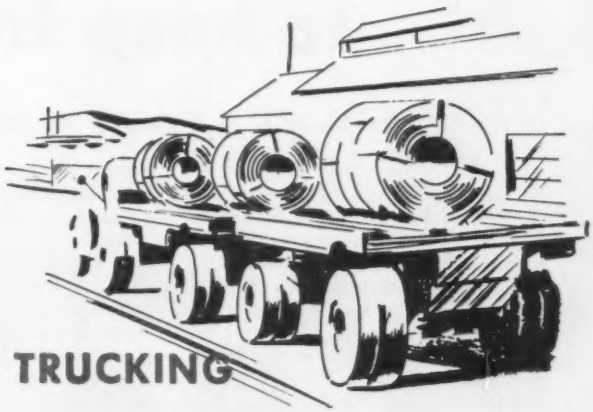
JOANNE COAL COMPANY
Rachel,
West Virginia
Coal

TITANIUM

MALLORY-SHARON TITANIUM CORPORATION
Niles, Ohio
Sheet, Strip, Forged Rod, Bar, and Billet Stock, Rolled Rod and Bar.

COKE

CARPENTERTOWN COAL & COKE CO.
Mt. Pleasant, Penna.—Coal and Bee-Hive Coke
FAIRMONT COKE WORKS—Fairmont, W. Va.
By-Product Coke



TRUCKING

STEEL TRUCKING, INC.—Detroit, Michigan—Transportation

Sales Offices

Chicago, Cincinnati, Cleveland, Dayton, Detroit, Grand Rapids, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Rochester, San Francisco, Sharon, Seattle, Montreal, Que., Toronto, Ont.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Steel doors gulp water to keep from melting

A typical example of B. F. Goodrich improvement in rubber

IT'S 3,000 degrees hot inside those steel mill furnaces. So hot that even the heavy steel doors would melt in minutes without protection. To cool them off, they make the doors hollow and pour water through in a constant flood.

But the doors must move up and down, so flexible hose is needed to feed water in and out. Hot metal spatters on the hose. Big "charging machines" bang it. Heat cooks it 24 hours a day, 7 days a week.

Rubber stand all *that?* B. F. Goodrich engineers believed it could, and designed a rubber hose armored with wire for strength and protected by asbestos for heat. Here's what happened when it was tried at the steel company in the picture.

Where other, more expensive hose burned out in a matter of months, or even weeks, the B. F. Goodrich hose is still good after more than a *year* of constant use. What's more, it is so much lighter, more flexible than other makes that workmen prefer it, and one man can install it where two were needed for other hose.

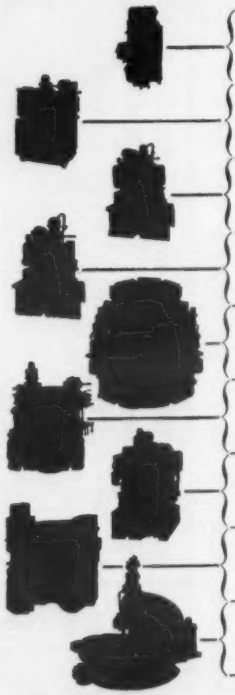
Finding a way to improve furnace door hose is an example of the B. F. Goodrich method of approaching a customer's problem. We have been able to solve equally difficult ones, just as successfully, in products you undoubtedly use. Your B. F. Goodrich distributor would like to tell you what these improvements are, and how they can be employed for your profit. *The B. F. Goodrich Company, Dept. M-534, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

Fellows — THE PRECISION LINE

Gear Production Equipment

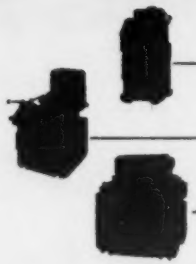
GEAR SHAPERS



FROM 1/16" TO 120" CAPACITY	SPUR AND HELICAL	EXTERNAL & INTERNAL	MAX. PITCH DIAMETER	MAX. DIAMETRAL PITCH	MAX. FACE WIDTH	MAX. STROKES PER MIN.
3" FINE-PITCH	both	yes	3 inches	40 steel, 30 brass	3/4" ext.	2000
No. 4GS	both	yes	6 inches	5/7 spur, 6 hel.	2"	635
7-TYPE*	both	yes	7" spur, 6 1/2" hel.	6 spur, 6/8 hel.	1 1/2" ext., 1" int.	450
7A-TYPE	both	yes	7" spur, 7" hel.	5/7 spur, 6 hel.	2" ext., 2" int.	450
No. 10 ROTARY	both	yes	12 inches	3/4 spur, 5/7 hel.	3" ext., 3" int.	500
6A-TYPE	both	yes	18 inches	3/4 spur, 5/7 hel.	5" ext., 3" int.	300
No. 12GS	both	yes	12 inches	3/4 spur, 5/7 hel.	4" ext., 4" int.	550
36-TYPE	both	yes	36 inches	3 spur, 4/5 hel.	6" ext., 6" int.	300
120-INCH	both	yes	120 inches	2 spur, 4 hel.	8" ext., 8" int.	148

*Max. P.D. internal—5 1/2"

SHAVING MACHINES



	SPUR AND HELICAL	EXTERNAL & INTERNAL	MAX. PITCH DIAMETER	MAX. DIAMETRAL PITCH	MAX. FACE WIDTH	MAX. SPREAD OF CENTERS
No. 4 FINE-PITCH	both	ext. only	4 inches	20	1 inch	12 inches
No. 8 "FULL-TOOL"	both	yes	8 inches	4	2 1/2 inches	**
No. 11 INTERNAL	both	int. only	***	6	1 1/2" up to 10p; 1", 12 to 16p	***

Also 12", 18" and 24" machines for externals only.

**Depends upon work-holding fixture

***Depends upon design of gear

INSPECTION INSTRUMENTS

		SPUR AND HELICAL	EXTERNAL & INTERNAL	MAX. PITCH DIAMETER
FOR COMPOSITE CHECK	No. 4 FINE-PITCH RED LINER	both	yes	4 inches
FOR COMPOSITE CHECK	No. 8M RED LINER	both	yes	***
FOR COMPOSITE CHECK	No. 20M RED LINER	both	yes	18 inches
INVOLUTE PROFILE CHECK	No. 12M INVOLUTE MEASURING	both	yes	12 inches
CHECKING LEAD CROWN & TAPER	No. 12H LEAD MEASURING	both	yes	12 inches

Nos. 24M Involute and 24H Lead Measuring Instruments with capacity of 24 inches

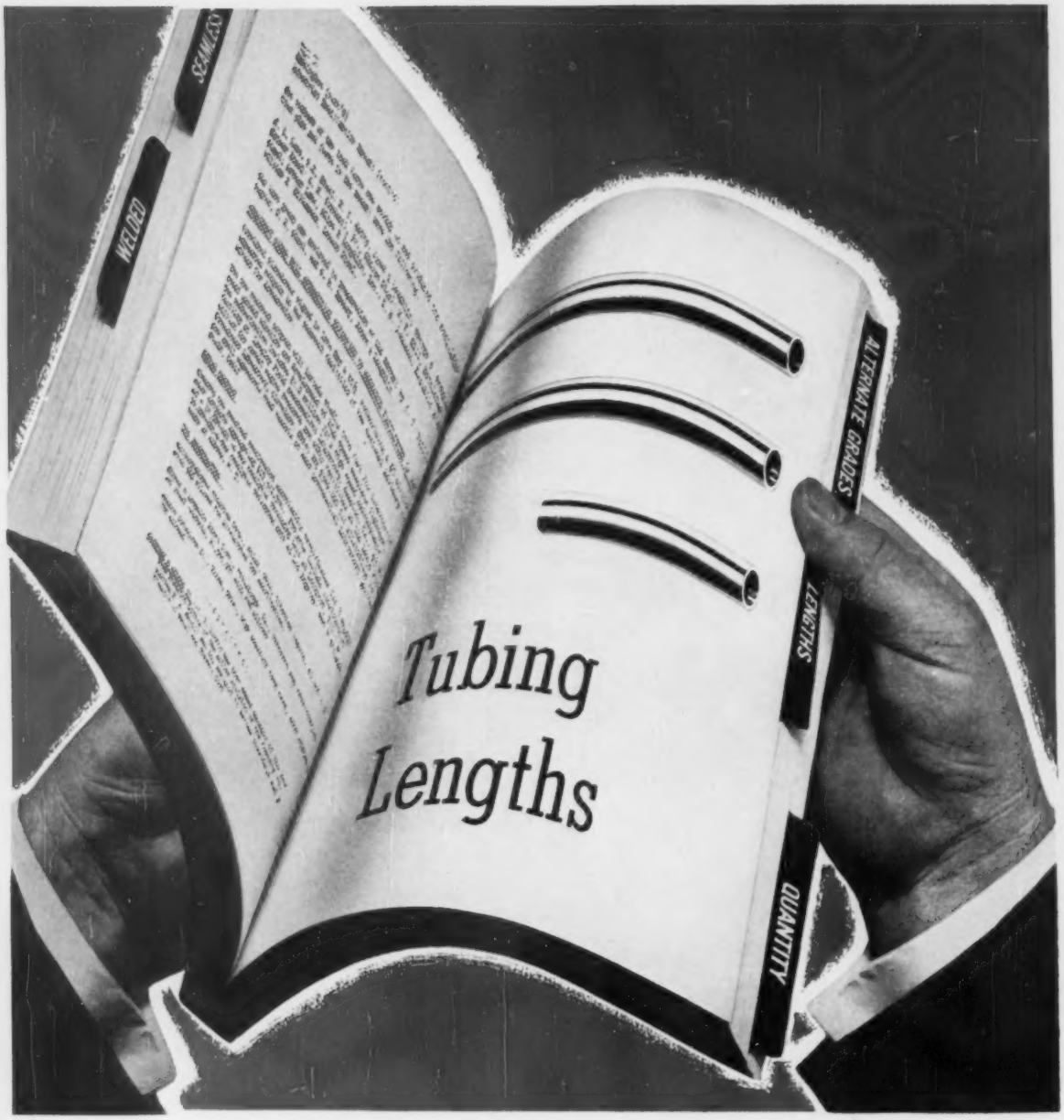
***Depends upon design of gear

In addition to the machines listed above, Fellows builds special-purpose equipment for production of gears and related items. Descriptive literature, as well as specific technical data and price information, will be gladly supplied by your Fellows Representative. WRITE, WIRE or PHONE any Fellows Office!

THE FELLOWS GEAR SHAPER COMPANY, 78 River Street, Springfield, Vermont

Branch Offices: 319 Fisher Building, Detroit 2 • 5835 West North Avenue, Chicago 39

2206 Empire State Building, New York 1 • 6214 West Manchester Avenue, Los Angeles 45



PURCHASING'S ROLE IN TUBING SELECTION

Even after a purchase requisition calling for tubing for any specific pressure or mechanical application is written, the purchasing agent must weigh many considerations.

In addition to selecting a tubing manufacturer, he must determine the type of length to order (random, multiple or cut length), quantity factors, alternate choice of seamless or welded, and alternate grades. All these factors can easily influence cost and/or delivery.

More and more alert purchasing agents are adopting B&W as their principal tubing supplier because B&W, in addition to offering literally millions of combinations to meet practically every conceivable tubing need, provides through Mr. Tubes—their link to B&W—the kind of friendly service that helps them get the most for their money.

B&W
TUBULAR PRODUCTS DIVISION

(TA-5052 G)

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

ANOTHER EXAMPLE of
REDUCING COSTS WITH—

Buhr ECONOMATION

Performs 23 operations every 18 seconds on automotive intake manifold!

This Buhr 5-way dial-type hydraulic-feed Special mills, drills, countersinks and individual-lead-screw taps 206 intake manifolds an hour gross.

The Machine is equipped with a Buhr 60″-diameter 6-position automatic index table, complete with shot bolt.

Chips are disposed automatically by means of a rotating chip conveyor.

Parts are loaded one per station in each of the six single-place fixtures. Power wrench with torque-control, automatically operates clamping mechanism.

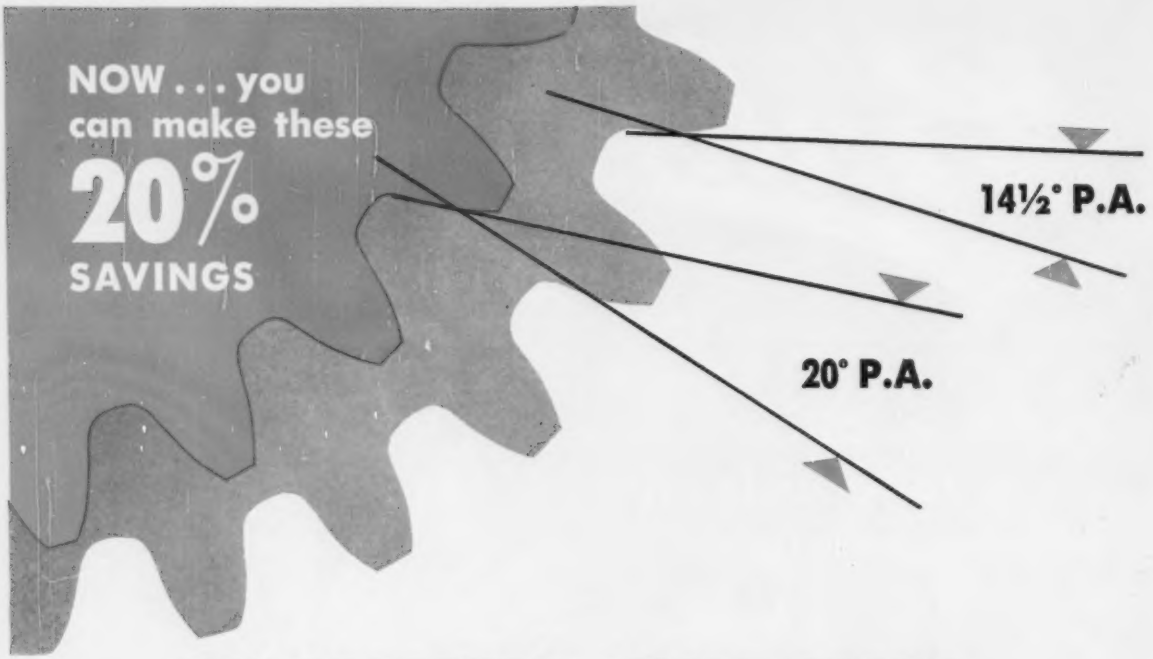
Buhr's precision manufacturing methods provide complete interchangeability of all parts and component assemblies.

Buhr
MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

BUHR MACHINE TOOL CO.©
ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers



with 20° PRESSURE ANGLE GEARS

BOSTON GEAR now offers 441 Standard Stock Sizes

Every engineer knows the mechanical advantages of the 20° P.A. tooth form. It's the standard for automotive drives, and wherever highest efficiency, with economy of space, weight, and cost are essential.

Now, BOSTON GEAR has the answer to the question of *availability*. A full range of *standard stock* sizes, supplied by all BOSTON GEAR Distributors, makes it practical to specify the 20° P.A. for virtually all spur, bevel, and miter gear applications.

Start making this big saving you've been missing. For details, call your BOSTON GEAR Distributor, or write: Boston Gear Works, 72 Hayward St., Quincy 71, Mass.

BOSTON GEAR CATALOG lists Standard Stock Sizes of 20° P.A. Spur, Bevel, and Miter Gears, along with the conventional 14½° P.A. Gears for every requirement. Ask for your copy.

SAVE 20% IN SPACE, WEIGHT, AND COST

COMPARE: SAME RATIO SAME HP

Example:

	14½° P.A.		20° P.A.	
	Pinion	Gear	Pinion	Gear
Pitch Diam.	2"	8.4"	1.66"	7.00"
Center Distance	5.200		4.333	
Weight	1 lb.	7½ lbs.	¾ lbs.	5 lbs.
List Price	1.95	8.65	1.70	6.70

Call your BOSTON Gear DISTRIBUTOR

For nearest Distributor, look under "GEARS", in the Yellow Section of your Telephone Directory

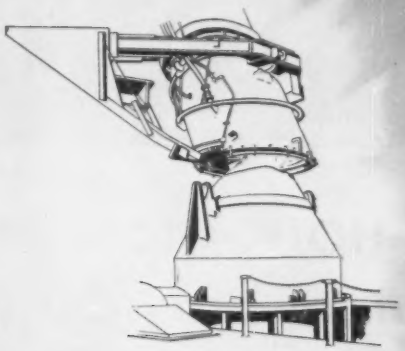
7124 "OFF-THE-SHELF" TRANSMISSION PRODUCTS FROM YOUR LOCAL DISTRIBUTOR — AT FACTORY PRICES

568G-G-18

Designed and Built
for Greater Strength...
and Durability...

OXYGEN CONVERTERS

AND AUXILIARY EQUIPMENT



Backed by more than three-quarters of a century of engineering know-how, fabricating and erecting experience — Oxygen Converters by Pennsylvania Engineering are the standard of quality and rugged durability throughout the iron and steel industry. Completely assembled, aligned and mechanically operated in our shops before shipment, they feature increased efficiency in the tilting mechanism, precision cut gearing and antifriction bearings.

PENNSYLVANIA ENGINEERING CORP.
NEW CASTLE, PA.
For over 75 Years DESIGNERS, FABRICATORS AND ERECTORS OF STEEL MILL EQUIPMENT

PEC OR

OTHER STEEL PLANT EQUIPMENT WE BUILD

Blast Furnaces . . . Open Hearth Furnaces . . . Hot Metal Mixers . . . Hot Metal Mixer Cars . . . Ladles . . . Ladle Transfer Cars . . . Scrap Cars . . . Slag Cars . . . Thermo Metal Cars . . . Jack Cars . . . Ingot Cars

HOUGHTON RUST VETO can make YOU happy, too!

Yours may not be a problem of keeping the blades of a pocket knife bright and shiny—the way Scouts like them—but this is an example of how Houghton helps in solving rust prevention problems.

In this case, the inhibitor had to keep rust from forming during processing, on the store shelf and in shipment—it had to be free from any effect on the non-metallic parts—and it had to be "invisible".

Houghton's ability to solve "pocket-size" rust prevention problems like this is just a small example of how the complete line of Houghton Rust Vetos can help you in your rust prevention problems. Call on the Houghton Man—outline your needs to him—and costly rust and corrosion losses will be stopped. E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pennsylvania.

RUST VETO
. . . products of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

HERE ARE A FEW OF THE POPULAR HOUGHTON RUST VETOS

RUST VETO 266

Primarily used for the neutralizing of fingerprints, it is actually a combination of rust preventive, cleaner and neutralizing agent. It possesses water displacing properties and forms a thin film on the metal which will remove drops or films of water by preferential wetting of the metal surfaces.

RUST VETO A-2

One of Houghton's oldest and best known preventives. It is a light solvent type which leaves a waxy, firm film, easily removed by solvent.

It is used for indoor protection of highly finished parts, stored or wrapped for shipment, such as tools, dies or gauges. It will withstand over 300 hours in the humidity cabinet at 100°F.

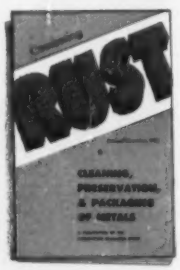
RUST VETO 377

A solvent polar type preventive, outstanding for long term indoor or shed storage. Its water displacing ability is useful in protecting parts already exposed to humidity. Providing a soft but durable .0005" film which can be removed by solvents, this product is applicable at minus 5°F. It withstands 30-day humidity cabinet test at 100°F.

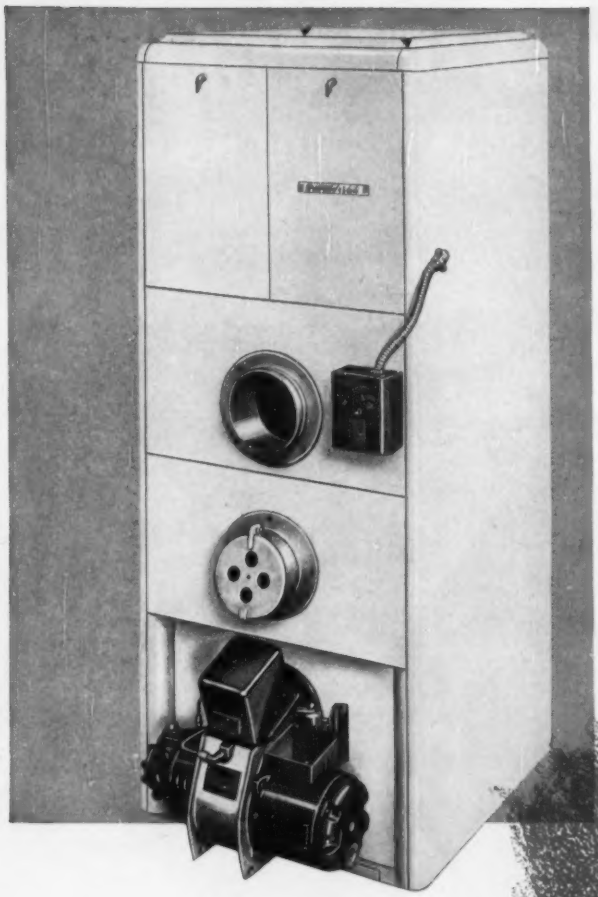
RUST VETO 344

A dark colored solvent solution, free from rosin or sediment, and drying rapidly so as to permit handling within one hour. It is readily removed by solvents.

It is recommended for the protection of metals stored outdoors and other applications where a dry, dark film is desired. This product shows no corrosive tendency toward steel, brass, aluminum or copper. An even film will be maintained down to 20° above zero without cracking.



Write for your copy of "Combating Rust"—a 72-page manual on all phases of rust prevention.

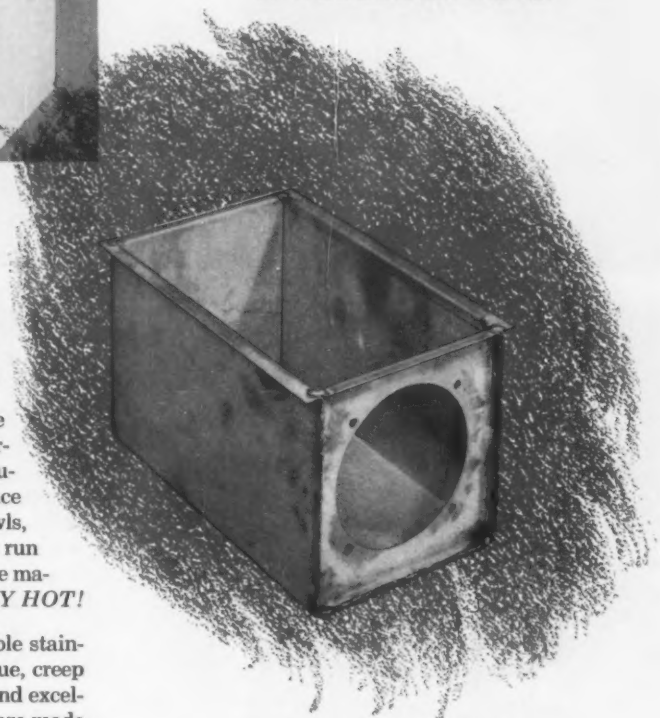


If it's meant to get

HOT

...use

CRUCIBLE STAINLESS



Crucible Type 430 firebox for the Perfection OC 90V Oil-Fired Furnace.

Say *"stainless steel,"* and most everyone thinks of bright appearance . . . corrosion resistance . . . strength without excess weight. But these properties are actually secondary in some applications.

As an example, take stainless steel's remarkable resistance to heat. That's the reason why The Perfection Stove Company uses types 309 and 430 Crucible stainless steels for its gas- and oil-fired furnace components — fireboxes, throat and burner bowls, combustion chambers, and baffles. In the long run stainless is the most dependable and least expensive material they can use for these parts that get *REALLY HOT!*

Of course, in addition to heat resistance, Crucible stainless steels offer corrosion resistance . . . high fatigue, creep and structural strength . . . resistance to wear . . . and excellent workability. And at Crucible, stainless steels are made by specialists who are concerned only with special purpose steels. They welcome the opportunity to help you select the best grade for the job. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

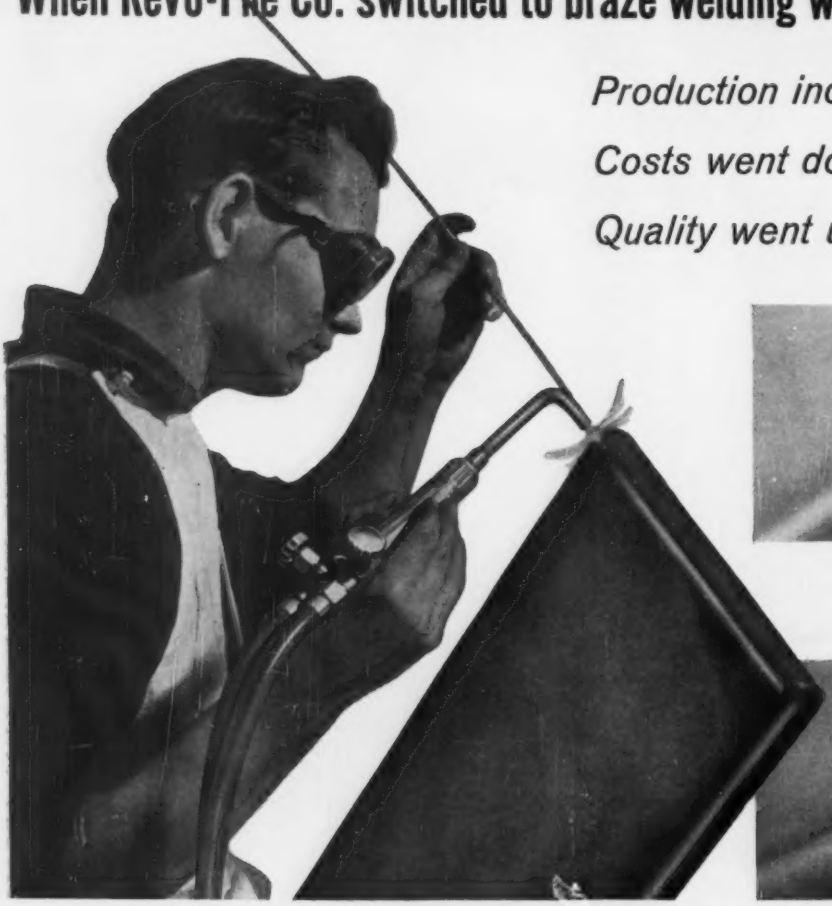
Crucible Steel Company of America

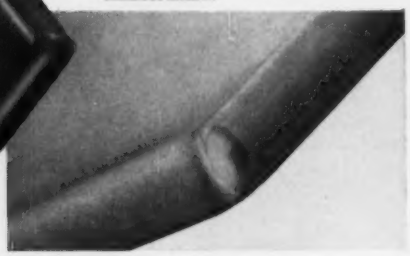
When Revo-File Co. switched to braze welding with Anaconda Rods

Production increased

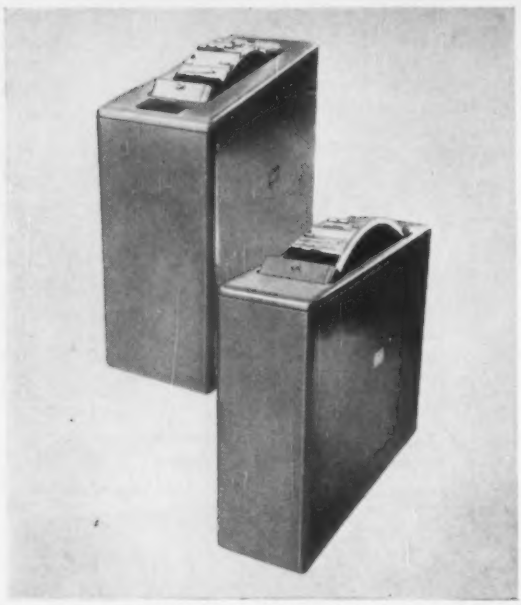
Costs went down

Quality went up





Close-up of braze weld in panel corner. Panels are #18 gage mild steel. **Below:** A corner after sanding – the basis for a smooth, perfect enamel finish.



Revo-Files, marketed by the Mosler Safe Company. Unit at left is electrically operated – a touch on a button brings desired section of revolving file into place. Right-hand unit is manually operated. Corners of top and two end panels, plus seams on the locking covers, are braze-welded.

14 superior braze welds in 7 minutes

The Revo-File Company of Freeport, L. I., used to arc-weld panel corners and locking-cover seams on its revolving-file cabinets. But they were troubled by lack of penetration and by considerable porosity.

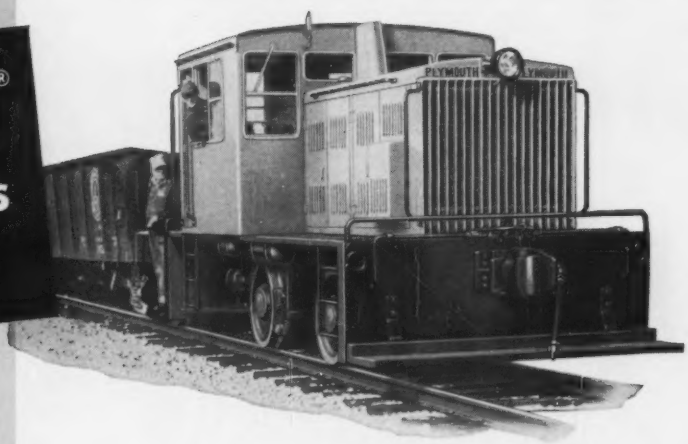
About six years ago, the Company turned to oxyacetylene braze welding, using Anaconda-997 (Low Fuming) Bronze Rod. They found that the rod flows smoothly, is easy to control – reducing the time required to make the welds. It takes only 7 minutes to complete 14 welds, an average of 30 seconds per weld.

In addition, the welds are uniformly sound and well-formed, reducing finishing time. Thus, for Revo-File Company, the switch meant better product quality, lower costs, and increased production.

Anaconda-997 (Low Fuming) Bronze is a superior welding rod used to join gray and malleable cast iron, steel, and copper alloys by the oxyacetylene process. It is one of a broad line of Anaconda Welding Rods that are finding increasing applications in production and repair welding. Anaconda Welding Rods are sold by distributors of welding equipment everywhere. Whitehead Metal Products Co. of New York furnish Revo-File Co. with Anaconda rods. See your Anaconda distributor or write: The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 55127

ANACONDA® WELDING RODS

PLYMOUTH®
Power on the rails for every job!



Here's the lineup of well-known Plymouth power in models from 3 to 70 tons . . . narrow or standard gauge . . . Gasoline or Diesel . . . mechanical or Torqomotive Drive . . . Diesel-Electrics. Records of users show Plymouth's economy, efficiency, dependability. Find out how these profit characteristics can improve your operation and cut costs.

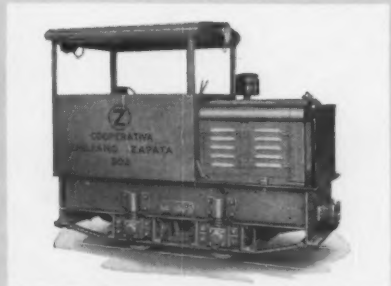
FREE ANALYSIS

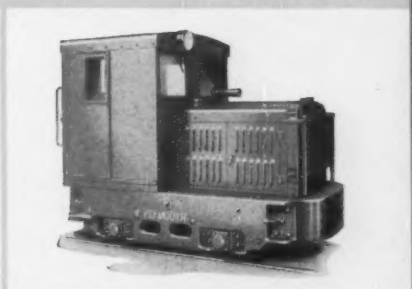
Send brief outline of your operating needs and problems for engineering analysis and new catalogs.

Plymouth Locomotive Works Division of
THE FATE-ROOT-HEATH COMPANY
Dept. A-2, Plymouth, Ohio

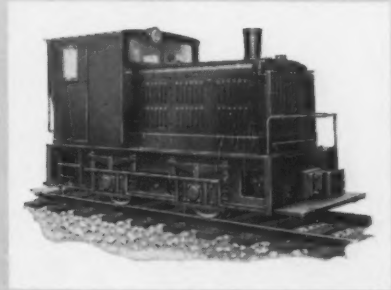
PLYMOUTH® TORQOMOTIVES

SINCE 1914 Plymouth Locomotives have been used for heavy hauling and switching jobs. They have proven themselves in year after year service with rock bottom economy, maximum availability, minimum down time. It takes a locomotive like Plymouth, ruggedly built, with plenty of power, and torqomotive control, to solve your switching and spotting problems efficiently, economically, and for many years to come.

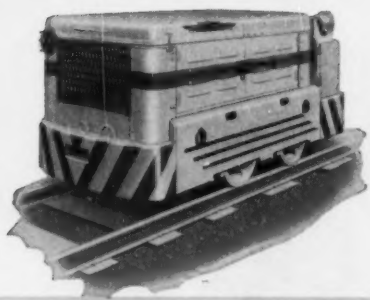




SERIES R&T (left)—3, 3½, 4 Tons, Gasoline or Diesel, Mechanical Drive, Compact for short turns, tight places. **SERIES F** (right)—5, 6 Tons, Gasoline or Diesel, Mechanical or Torqomotive* Drive. Low center of gravity, short wheelbase.

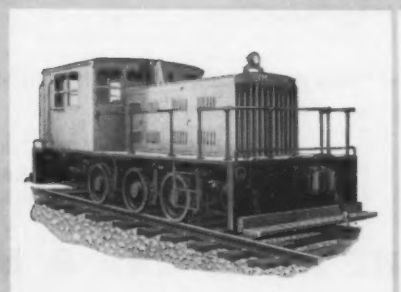


SERIES D (left)—8, 10 Tons, Gasoline or Diesel, Mechanical or Torqomotive Drive, Cast or Welded Frame. **SERIES J** (right)—12, 14, 16, 18, 20 Tons, Gasoline or Diesel, Mechanical or Torqomotive* Drive. 4- or 6-wheel Drive.



MINE-O-MOTIVE 5, 6, 7, 8, or 10 Tons Torqomotive* Drive. First Diesel-powered locomotive to operate in American coal mines, approved under Schedule #22, U.S. Bureau of Mines.

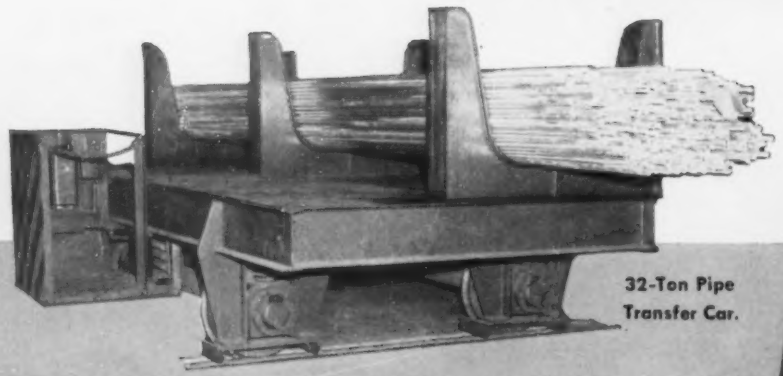
SERIES DE—25, 45, 50 Tons, Diesel-Electric Drive.



SERIES M & W (left)—25, 30, 35, 40 Tons, Gasoline or Diesel, Mechanical or Torqomotive* Drive, 4- or 6-wheel Drive. **SERIES KC & KH** (right)—45, 50, 65, 70 Tons, Mechanical or Torqomotive* Drive, Diesel only. Heaviest duty, direct drive.

***Torqomotive Drive:** Plymouth transmission coupled to automatic torque-converter.

SIMPLIFIED *Safety Type* TRANSFERS



32-Ton Pipe Transfer Car.

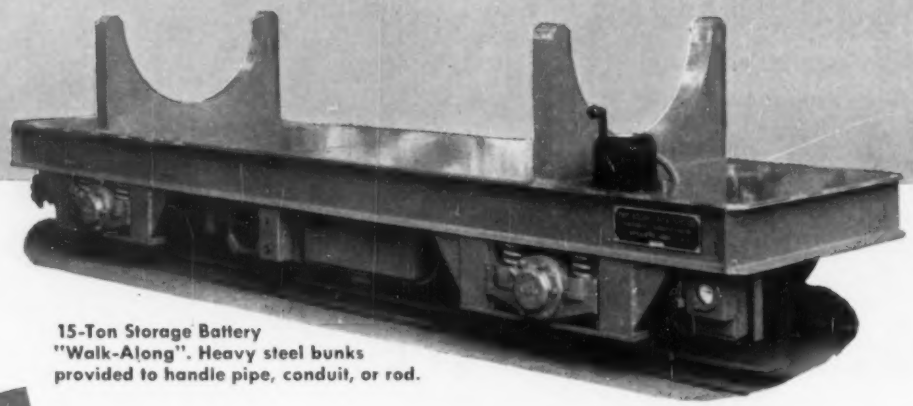
- STORAGE BATTERY Walk-Along or Rider-Type
- GAS-ELECTRIC
- DIESEL-ELECTRIC
- CABLE REEL . . . AC
- CABLE REEL . . . DC
- CABLE REEL . . . AC with fluid coupling

Also remotely controlled cars without trailing cable.

• Atlas Transfers are controlled by one lever. When the lever is released the car stops. This simplicity assures safety so that no assigned operator is necessary.

SAFE because there is only one control lever.

SAFE because the car will move only when the operator holds the lever.



15-Ton Storage Battery "Walk-Along". Heavy steel bunks provided to handle pipe, conduit, or rod.

Ask for "Walk-Along" Bulletin 1283 for complete transfer car information.

Manufacturer of Ore Transfer Cars • Scale Cars • Coal Charging Cars • Coke Quenching Cars • Coal and Metal Mining Storage Battery Locomotives.

THE ATLAS CAR & MANUFACTURING CO.

1100 IVANHOE ROAD **CLEVELAND 10, OHIO**

World's largest builders of world's largest cranes

ALLIANCE PLAYS A VITAL ROLE

450/75/20-TON, 4-GIRDER LADLE CRANES

When the engineers from the Construction Engineering Bureau of the United States Steel Corporation were in the market for the world's largest ladle cranes for Fairless Works, they consulted The Alliance Machine Company, whose experience and know-how qualified them for this important task.

One of the cranes Alliance designed, which is now operating in the Fairless Works, is this 450-ton ladle crane. Having a 69'6" span, this crane is equipped with a 2-motor, synchronized worm drive and double-drum interlocked type main hoist. The synchronizing shaft employed in the gearing scheme not only eliminates undesirable ratchet gears, but makes possible an additional safety feature in case one hoist motor fails. Under this condition, both worms are driven by the remaining motor. All gearing functions continue as though operated with two motors. In case of hoist motor failure on the conventional drive **without** the synchronizing shaft, hoisting is accomplished by **only one** set of gears, thus imposing a double load on active gearings, as the second drum is then driven through interlocking drum gears.

Hoist gearing is so proportioned that full crane capacity can be lifted by one motor without exceeding the quarter-hour rating.

Drum gears and pinions of the main hoist have precision-cut, single-helical teeth. This feature, in cooperation with the worm drive, provides vibrationless operation on either high- or low-speed hoisting and lowering.

All gears of this new Fairless Works crane are fully enclosed and operate in a bath of oil, assuring long life and low maintenance. The 4-part safety rope system affords the highest degree of safety in rope reeving.

This crane is equipped with a 5-story cab, the operator's compartment being air-conditioned.

Consult Alliance Machine Company engineers when you have a heavy material handling problem.

THE *Alliance* MACHINE COMPANY

MAIN OFFICE
ALLIANCE, OHIO

PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

with Bucyrus-Erie crane performance like this

Precision Control . . . of Bucyrus-Erie Transit Cranes helps operators stack materials carefully, using every square foot of yard space. Direct-connected controls permit "full-feel" of loads, with instant response. Independent boom hoist allows boom angle to be changed while swinging or propelling, or while lifting or lowering loads. Boom hoist is the power-controlled-lowering type, operated by a single hand lever. Lowering control is so accurate that even bulky, odd-size loads can be inched into position. Such accuracy permits making better use of yard space.

Maximum Safety . . . is assured, too, with such Bucyrus-Erie features as wide-area safety-glass windows, sturdy, firm-footed carrier mounting, swing lock to prevent load from swinging while machine is propelling, boom stops to keep boom from snapping over center, and boom angle indicator to let operators figure load factors easily.

Your Bucyrus-Erie distributor will gladly give you complete information on carrier-mounted 15- and 25-ton Transit Cranes. Crawler-mounted machines also available in eight different sizes — ask about them, too!

167E55

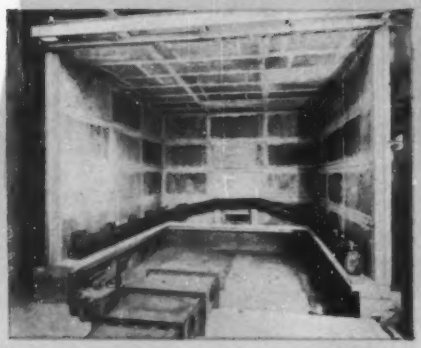
BUCYRUS ERIE
South Milwaukee Wisconsin

75 YEARS OF SERVICE to Men Who Shape the Earth

INDUSTRY REPORTS:

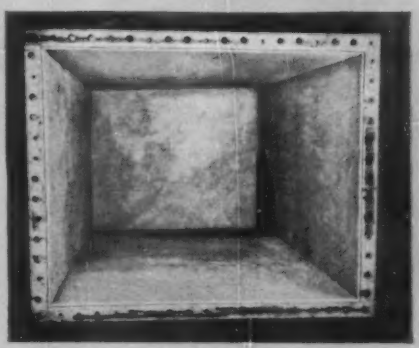
cost-reducing uses for

Refractory Castable Insulation



Roof and wall panels are made of B&W Insulating Concrete Mix in this stress relieving furnace.

Covers, measuring six and eight feet in diameter, for these 10 draw and hardening furnaces are also lined with B&W Insulating Concrete Mix.



Shown above is a section of a gas turbine exhaust stack lining completely cast with B&W Insulating Concrete Mix.

Here are a few examples of how furnace operators are cutting installation and fuel costs with versatile insulating concretes.

In intricate furnace linings, for instance, B&W Insulating Concrete Mixes do away with time-consuming hand fitting and the many necessary special shapes. These refractory concretes, which can be exposed to flame up to 2200F, have approximately twice the insulating value of regular refractory castables, and are as easy to use.

Other uses include: Holding furnace roof panels, Portable furnace extensions, Annealing furnace bung covers, Patching insulating firebrick linings, Lining ducts and flues, Protection for furnace foundations, Hardening furnace cover linings, Car bottom linings, Cooling pit walls and roofs, Dust collector linings, Door linings, Protection for furnace steelwork.

Briefly, B&W Insulating Concrete Mixes can be put to profitable use wherever the combination of a castable's fast, low cost installation plus insulation is needed. Though somewhat less efficient thermally than B&W Insulating Firebrick, B&W Insulating Concrete Mixes are far superior to regular castables in insulating value. In fact, 7 inches of B&W Insulating Concrete Mix are equivalent, in insulating value. to 24 inches of regular refractory concrete or firebrick.

Get all the facts from your local B&W Refractories Engineer—or write for Bulletin R-22, which gives complete details on B&W's entire line of refractory castables.

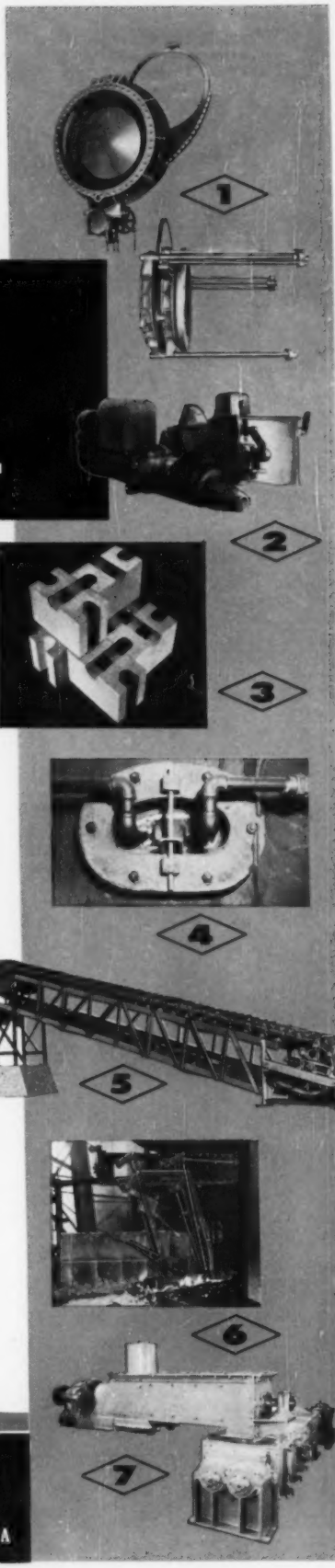
B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
OTHER B&W PRODUCTS: Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units • Seamless & Welded Tubes • Pulverizers • Fuel Burning Equipment
Pressure Vessels • Alloy Castings

BABCOCK & WILCOX
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES 161 EAST 42nd ST. NEW YORK 17 N.Y.
WORKS: AUGUSTA, GA.

R-884

These Jobs are done more efficiently

WITH Bailey EQUIPMENT



1 For Controlling Gas Mains... Bailey Goggle Valves in thermal expansion (36" to 120" diameters) and mechanical (6" to 72" diameters) types.

2 For Plugging Tapping Holes... Bailey Clay Guns provide plenty of power and clay capacity for maintaining long holes.

3 For Blast Furnace Stoves... Bailey services include design, construction and relining — using Kennedy Checkers with cross-flue feature.

4 For Cooling Blast Furnace Linings... Bailey Cooling Plate Holder provides a gas- and water-tight seal, with ease of removal for inspection or replacement.

5 For Pig Casting... Bailey Pig Casting Machines provide trouble-free service while increasing casting capacity for foundries and blast furnaces.

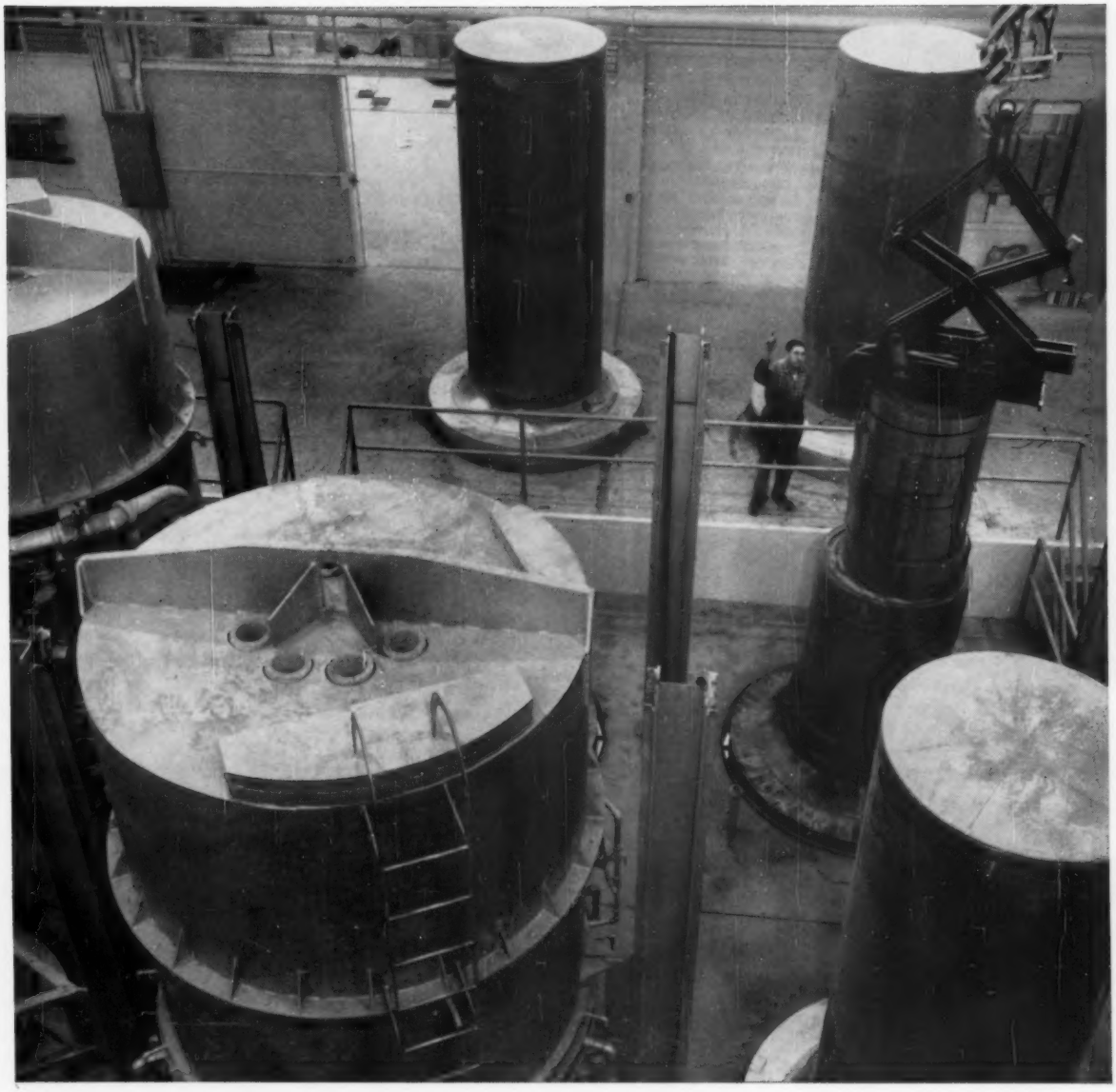
6 For Stopping Cinder Notches... Bailey Cinder Notch Stoppers eliminate hazards to workmen at the cinder notch.

7 For Sintering... Bailey Pug Mills assure efficient pugging or mixing for blast furnace dust catchers and sintering plants. Feeder illustrated for Dust Catcher Mill maintains an even flow of the material to be processed.

Other Bailey Products: Blast Furnace Cold Blast Valve • Blast Furnace Blow-Off Valve • Check and Snort Valve • Mixing and Check Relief Valve • Fabricated Steel Stove Bottom • Precision Table Feeder • Ladle Skulling Hook

Bailey ENGINEERS

1221 BANKSVILLE ROAD PITTSBURGH 16, PA



Thompson Wire Company anneals cold rolled strip with *GAS*

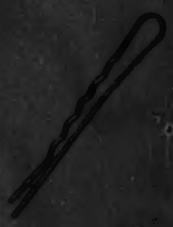
These are Gas-fired annealing facilities at Thompson Wire Company, Baltimore, Maryland. Here, modern industrial Gas equipment anneals cold rolled strip and assures proper quality for a variety of applications.

Coils of strip are placed one on top of the other on a stationary base. Then, a portable Gas-fired bell furnace is lowered over the stacked coils. Twelve Eclipse Gas burners heat the coils to the proper annealing temperature in a prepared inert gas atmosphere released from inner cones. After firing, the furnace is lifted from the base and replaced with a cooling hood which helps slow down and equalize the cooling rate. Finally, the hood is removed and the coils of strip are lifted from the base.

With Gas, Thompson Wire Company can anneal up to 50,000 pounds of strip in 36 hours. Thompson Wire also uses Gas for water heating.

For further information on how Gas can help you in your heat treating operations, call your Gas Company Industrial Specialist. He'll be glad to discuss the economies and results Gas and modern Gas-fired industrial equipment can provide. *American Gas Association.*

MB Spring Wire



Bobby Pin Wire

Brush Wire

CF&I-WICKWIRE

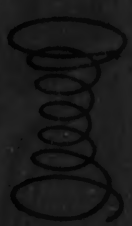
offers you

long and diversified wire-making experience

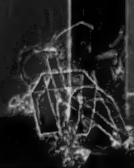
Hose Wire

Flexible Shaft Wire

Spheroidized Wire



Gamma Spring Wire



Picture Cord Wire

Stapling Wire

Rope Wire

Every time you use CF&I-Wickwire Wire, you reap the benefit of over a century's wire-making experience—experience which means uniform wire that *always* has the proper characteristics to meet the needs for which it is designed.

What's more—ever since the first member of the CF&I-WICKWIRE family started drawing wire back in 1821—this experience has been steadily diversified. As a result, today's CF&I organization offers one of the most complete lines of wire available anywhere. Just check the partial list shown here!

Ask the CF&I-WICKWIRE representative near you for complete details on how you can take full advantage of our long and diversified experience. No obligation on your part, of course.

Clip Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque · Lazelle · Billings · Provo · Salt Lake City · Denver · El Paso · Ft. Worth · Houston · Limon (Okla.) · Oklahoma City · Phoenix · Pueblo · Salt Lake City · Wichita

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CF&I

other wires made by C F & I-WICKWIRE include:

flat and shaped wires

Armor Wire (Half Oval)
Bookbinder Wire
Brush Wire, Tempered Flat (Gutter Broom Wire)
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel

fine and specialty wires

Aircraft Cord Wire
Armature Binding Wire
Bee Wire
Belt Hook Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Brush Wire (High Strain)
Curtain Spring Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Hose Reinforcement Wire
Mattress Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Spiral Binding Wire
Stone Wire
Weaving Wire
Wissco Iron Wire

manufacturers' wire

Armor Wire
Box Binding Wire
Brush Handle Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire
Merchant Quality Wire
Strand Wire
Tying Wire

high carbon steel wire

Bobbin Ring Wire
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Hat Wire
Spoke Wire
Tire Bead Wire
Valve Spring Wire

FOR THE WIRE YOU REQUIRE—CHECK CF&I-WICKWIRE

3565

ONE bright spot in the cost picture . . .

JOHNSON BEARINGS

Labor costs, overhead and materials continue to rise. Yet . . . here is one item on which you can save money . . . Johnson Sleeve Bearings. They are low in first cost, economical in installation, and give long, satisfactory performance. Perhaps you are using more bearing than you need. Investigate Johnson Bearings. They are produced in industry's widest range of bearing metals and types: aluminum on steel, bronze on steel, babbitt on steel or bronze, powder metallurgy, cast bronze, cast aluminum alloy, sheet bronze and graphite inserts. Design or redesign to utilize the economies of Johnson Sleeve Bearings. Free engineering consultation is yours for the asking. Write.

JOHNSON BRONZE CO.
505 S. Mill St., New Castle, Pa.

JOHNSON JB BEARINGS
Sleeve-Type

UNITED®

6 stand continuous horizontal and vertical Billet Mill

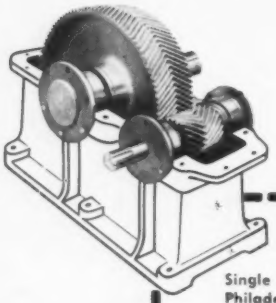
UNITED ENGINEERING AND FOUNDRY COMPANY
Pittsburgh, Pennsylvania

PLANTS AT PITTSBURGH • VANDERGRIFT • YOUNGSTOWN
CANTON • WILMINGTON (LOBDELL UNITED DIVISION)

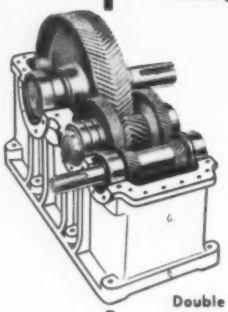
SUBSIDIARIES: ADAMSON UNITED COMPANY, AKRON, OHIO
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

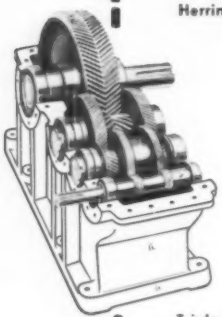
REDUCER PROBLEM?.....consult



Single reduction
Philadelphia
Herringbone Reducer



Double reduction
Philadelphia
Herringbone Reducer



Triple reduction
Philadelphia
Herringbone Reducer

If you have a problem involving high horsepower speed reduction with heavy shock loads, Philadelphia Herringbone Reducers are the answer. These quality-built units are available in Single, Double and Triple Reduction types, offering a wide selection of capacities and reduction ratios. The continuous tooth type herringbone gears assure evenly distributed pressure over each tooth from the top to the working depth line, — which means exceptionally long life, minimum vibration, quiet operation and maximum transmission of power . . . Thousands of Philadelphia Herringbone Reducers are in daily use, in most every line of industry. Be convinced, send for Catalog H-49.

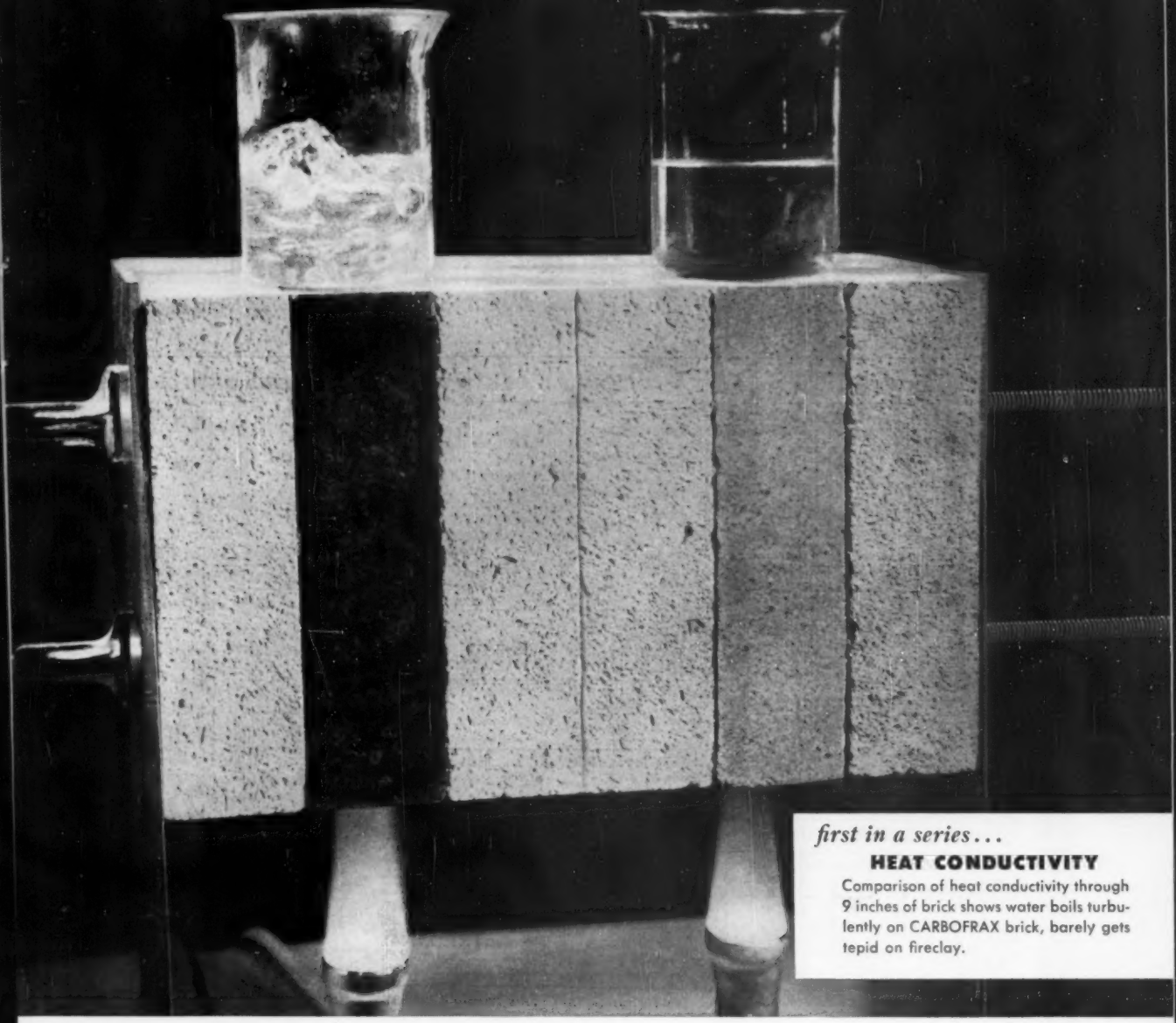
PHILADELPHIA GEAR WORKS
INCORPORATED

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
BALTIMORE • CLEVELAND
Virginia Gear & Machine Corp., Lynchburg, Va.

Industrial Gears & Speed Reducers • LimiTorque Valve Controls

Established 1892



first in a series...

HEAT CONDUCTIVITY

Comparison of heat conductivity through 9 inches of brick shows water boils turbulently on CARBOFRAX brick, barely gets tepid on fireclay.

Unusual Properties of Refractory Materials

High heat conductivity — roughly 11 times that of fireclay and about 70% that of chrome-nickel steels — is one of the properties of CARBOFRAX® silicon carbide refractory brick. It is an ideal material for muffles, radiant tubes, retorts and similar structures where you need exceptional resistance to direct flame *plus* the ability to conduct heat efficiently. At 2200°F, thermal conductivity of CARBOFRAX brick is 109BTU/hr., sq. ft. and °F/in. of thickness.

CARBOFRAX refractories typify the many super refractories pioneered by Carborundum. Each has a wide range of properties. One, for example, is formed into precision parts that look like cast iron yet resist over 3000°F. Another, a new ceramic fiber, filters and insulates at temperatures no existing mineral or glass fiber can take.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Heat Conductivity". Send for your copy today.

CARBORUNDUM

Registered Trade Mark

VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES

CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE

HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

all in the new magazine "Refractories"

—MAIL THIS COUPON TODAY—

Dept. B16, Refractories Division
The Carborundum Co., Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

ELECTROMET

TRADE-MARK

BORON ALLOYS

Ferroboron	Aluminum ...max. 0.50%
Min. 10.00% Boron Grade	Carbon .....max. 1.50%
Min. 17.50% Boron Grade	Aluminum ...max. 0.50%
	Carbon .....max. 0.50%
Manganese-Boron	Boron .....min. 17.50%
	Manganese ..approx. 75%
	Carbon .....max. 3%
	Iron .....max. 5%

CALCIUM ALLOYS

Calcium-Silicon	Calcium .....30 to 33%
	Silicon .....60 to 65%
	Iron .....1.50 to 3%
Calcium-Manganese-Silicon	Calcium .....16 to 20%
	Manganese ...14 to 18%
	Silicon .....53 to 59%
Calcium Metal	
Regular Grade	Calcium .....99% Balance largely Magnesium and Aluminum
Distilled Grade	Calcium..approx. 99.50% Balance largely Magnesium

CHROMIUM ALLOYS

"Simplex" Low-Carbon Ferrochrome No. 1	Chromium ....63 to 66%
	Silicon .....5 to 7%
	Carbon ....max. 0.010% or 0.025%
2% Nitrogen-Bearing Grade	Chromium ....62 to 65%
	Silicon .....5 to 7%
	Nitrogen .....2 to 2.5%
	Carbon ....max. 0.025%
5% Nitrogen-Bearing Grade	Chromium ....60 to 63%
	Silicon .....5 to 7%
	Nitrogen .....5 to 6%
	Carbon ....max. 0.025%
"Simplex" Low-Carbon Ferrochrome No. 2	Chromium ....63 to 66%
	Silicon .....max. 1.00%
	Carbon ....max. 0.025%
2% Nitrogen-Bearing Grade	Chromium ....62 to 65%
	Silicon .....max. 1.00%
	Nitrogen .....2 to 2.5%
	Carbon ....max. 0.025%
5% Nitrogen-Bearing Grade	Chromium ....60 to 63%
	Silicon .....max. 1.00%
	Nitrogen .....5 to 6%
	Carbon ....max. 0.025%
Low-Carbon Ferrochrome (Other Grades)	Chromium ....67 to 71%
	Silicon ...0.30 to 1.00%
	Carbon (10 Grades) max. 0.02 to max. 2.00%

CHROMIUM ALLOYS cont.

High-Carbon Ferrochrome	Chromium ....66 to 70%
Medium Carbon Grade	Silicon .....max. 2%
	Carbon ...2.25 to 3.00%
	Sulphur .....max. 0.03%
Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium ....67 to 70%
	Silicon .....1 to 2%
Max. 7.00% Carbon Grade	Chromium ....66 to 69%
	Silicon .....1 to 3%
Min. 7.00% Carbon Grade	Chromium ....65 to 68%
	Silicon .....1 to 3%
Low-Chromium Grade	Chromium ....57 to 64%
	Carbon .....3.5 to 5%
	Silicon .....2 to 4.5%
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium ....65 to 70%
	Silicon ...0.30 to 1.00%
	Carbon .....max. 0.10%
	Nitrogen ..0.75 to 2.00%
"SM" Ferrochrome	Chromium ....60 to 65%
	Silicon .....4 to 6%
	Carbon .....4 to 6%
	Manganese ....4 to 6%
"EM" Ferrochrome-Silicon	Chromium ....39 to 41%
	Silicon .....42 to 45%
	Carbon .....max. 0.05%
"EM" Ferrosilicon-Chrome	Chromium ....50 to 54%
	Silicon .....28 to 32%
	Carbon .....max. 1.25%
Exothermic Ferrochrome S	Chromium ..approx. 50%
	Carbon ....approx. 2.5%
Exothermic Ferrochrome B	Chromium ..approx. 48%
	Carbon .....approx. 4%
Exothermic Silicon-Chrome	Chromium ..approx. 44%
	Silicon .....approx. 22%
	Carbon .....max. 1.00%
Foundry Ferrochrome	Chromium ....62 to 66%
	Silicon .....7 to 10%
	Carbon .....5 to 7%
Foundry Ferrosilicon-Chrome	Chromium ....50 to 54%
	Silicon .....28 to 32%
	Carbon .....max. 1.25%
Chromium Metal	Chromium ....88 to 91%
High-Carbon Grade	Carbon .....9 to 11%
	Iron .....max. 0.75%
Electrolytic Grades	Chromium ..min. 99.85%
Laboratory Grade	Iron .....max. 0.03%
Commercial Grade	Chromium ..min. 99.80%
	Iron .....max. 0.20%
"EM" Chromium Briquets (Hexagonal Shape)	Chromium .....2 lb.
	Total Weight .....3⅛ lb.

COLUMBIUM ALLOYS

Ferrocolumbium	Columbium ...50 to 60%
	Silicon .....max. 8%
	Carbon .....max. 0.40%
Ferrotantalum-Columbium	Columbium ..approx. 40%
	Tantalum ...approx. 20%
	Cb+Ta .....min. 60%
	Carbon .....max. 0.30%
	Iron .....approx. 25%

MANGANESE ALLOYS

Standard Ferromanganese	Manganese ...74 to 76%
Regular Grade	Carbon .....approx. 7%
	Silicon .....max. 1%
Low-Phosphorus Grade	Manganese ...78 to 80%
	Carbon .....max. 7%
	Silicon .....max. 2%
	Phosphorus ..max. 0.10%
Low-Carbon Ferromanganese	Manganese ....min. 90%
	Carbon .....max. 0.07%
Low-Phosphorus Grade	Phosphorus ..max. 0.06%
Regular Grades	Manganese ...85 to 90%
	Carbon ..max. 0.07, 0.10, 0.15, 0.30 or 0.50%
Regular Grade (High-Silicon)	Manganese ...80 to 85%
	Carbon .....max. 0.75%
	Silicon .....5 to 7%
"Mansiley" Alloy	Manganese ...60 to 63%
	Silicon .....28 to 31%
	Carbon .....max. 0.07%
	Phosphorus ..max. 0.05%
Silicomanganese	
Max. 1.50% Carbon Grade	Manganese ...65 to 68%
	Silicon .....18 to 20%
Max. 2.00% Carbon Grade	Manganese ...65 to 68%
	Silicon ....15 to 17.50%
Max. 3.00% Carbon Grade	Manganese ...65 to 68%
	Silicon ....12 to 14.50%
Low-Iron Ferromanganese	Manganese ...85 to 90%
	Carbon ...approx. 7.00%
	Silicon .....max. 3%
	Iron .....max. 2%
Medium-Carbon Ferromanganese	Manganese ...80 to 85%
	Carbon ...1.25 to 1.50%
	Silicon.max. 1.00 or 1.50%
Nitrogen-Bearing Grade	Manganese ...78 to 81%
	Carbon ...1.15 to 1.50%
	Silicon .....max. 1.50%
	Nitrogen ..approx. 4.50%

IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET. If you need help in selecting the proper alloys, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed at right.

Birmingham 2, Ala.....2900 Cahaba Road
Chicago 1, Ill.....230 N. Michigan Avenue
Cleveland 14, Ohio.....1300 Lakeside Avenue
Detroit 21, Mich.....10421 West Seven Mile Road
Houston 11, Texas.....6119 Harrisburg Boulevard
Los Angeles 58, Calif.....2770 Leonis Boulevard
New York 17, N.Y.....30 East 42nd Street
Pittsburgh 22, Pa.....Oliver Building
San Francisco 6, Calif.....22 Battery Street
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

MANGANESE ALLOYS cont.

Manganese Metal Electrolytic Grade	Manganese .min. 99.90%
Nitrogen-Bearing Electrolytic Grade	Manganese ..approx. 93% Nitrogen ....approx. 6%
"EM" Silico-manganese Briquets (Square Shape)	Manganese .....2 lb. Silicon .....½ lb. Total Weight .....3½ lb.
"EM" Ferro-manganese Briquets (Oblong Shape)	Manganese .....2 lb. Total Weight .....3 lb.

SILICON ALLOYS

50% Ferrosilicon Regular Grade	Silicon .....47 to 51%
Blocking Grade	Silicon .....47 to 51%
Boron-Bearing Grade	Silicon .....47 to 51% Boron ....0.04 to 0.05% Or higher if desired
Low-Aluminum Grade	Silicon .....47 to 51% Aluminum ...max. 0.40% or 0.10%
Ferroaluminum-Silicon	Silicon .....approx. 50% Aluminum ..approx. 10%
65% Ferrosilicon Regular Grade	Silicon ..64.50 to 69.50%
Low-Impurity Grade	Silicon ..... 62 to 68% Aluminum .. max. 0.40% Total Impurities max. 0.85%
75% Ferrosilicon Regular Grade	Silicon .....73 to 78%
Low-Aluminum Grade	Silicon .....73 to 78% Aluminum ...max. 0.50%
85% Ferrosilicon Regular Grade	Silicon .....83 to 88%
Calcium-Bearing Grade	Silicon .....83 to 88% Calcium ....min. 0.50%
Low-Aluminum Grade	Silicon .....83 to 88% Aluminum ...max. 0.50%
90% Ferrosilicon Regular Grade	Silicon .....92 to 95%
Low-Aluminum Grade	Silicon .....92 to 95% Aluminum ...max. 0.50%

SILICON ALLOYS cont.

Silicon Metal Regular Grade	Silicon min. 98 or 96.50% Iron..max. 0.75 or 1.50% Calcium ....max. 0.07%
Purified Grade	Silicon ..99.70 to 99.90% Iron .....005 to .015%
Low-Calcium Grade	Silicon .....min. 98% Iron .....max. 0.75% Calcium ....max. 0.03%
Low-Aluminum Grade	Silicon .....min. 98.50% Iron .....max. 0.75% Aluminum ...max. 0.10% Calcium ....max. 0.03%
"EM" Silicon Briquets Large Size (Cylindrical or Brick-Shape)	Silicon .....2 lb. Total Weight .....5 lb.
Small Size (Cylindrical Shape)	Silicon .....1 lb. Total Weight .....2½ lb.
"SMZ" Alloy	Silicon .....60 to 65% Manganese ....5 to 7% Zirconium .....5 to 7%
Magnesium-Ferrosilicon Regular Grade	Silicon .....43 to 47% Magnesium ..7.5 to 9.5%
Cerium-Bearing Grades	Cerium ...0.45 to 0.60% or .....1.80 to 2.20%

TITANIUM ALLOYS

Ferrotitanium	Titanium ..27 to 32%, 50 to 55%, or 68 to 72% Carbon .....max. 0.10%
Silicon-Titanium	Titanium .....40 to 50% Silicon .....45 to 50% Iron .....max. 3%
Manganese-Nickel-Titanium	Titanium 46.50 to 48.50% Nickel .....29 to 31% Manganese ... 6 to 8%

TUNGSTEN ALLOYS

Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-50
Tungsten Metal Powder Melting Grade	Tungsten ...min. 98.80% Total Carbon..max. 0.25%

TUNGSTEN ALLOYS cont.

Calcium Tungstate	Tungstic Oxide..68 to 72%
Calcium Tungstate Nuggets	Tungstic Oxide..68 to 72%
Ammonium Paratungstate	Tungstic Oxide.min. 88.7%

VANADIUM ALLOYS

Aluminum-Vanadium	Vanadium ....80 to 85% Aluminum ....13 to 16% Iron .....max. 1% Silicon .....max. 1% Oxygen .....max. 0.25%
Ferrovanadium	Vanadium ....50 to 55% or 70 to 75% Carbon ..max. 0.20, 0.50, or 3.00% Silicon ..max. 1.50, 2.00, or 8%; and approx. 10%
Vanadium Oxide Fused	V_2O_5 .....86 to 89% Na_2O .....approx. 10% CaO .....approx. 2%
Sodium Polyvanadate (Red Cake)	V_2O_5 .....approx. 85% Na_2O .....approx. 9%
High-Purity Ammonium Metavanadate	V_2O_5 ....approx. 99.50% NH_4VO_3 .....min. 99%

ZIRCONIUM ALLOYS

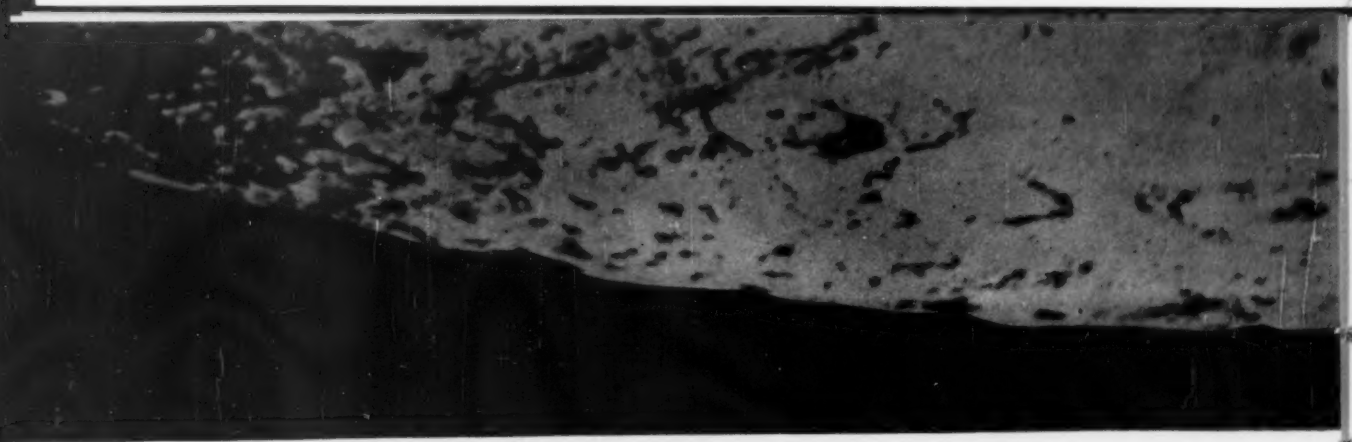
12 to 15% Zirconium Alloy	Zirconium ....12 to 15% Silicon .....39 to 43% Carbon .....max. 0.20%
35 to 40% Zirconium Alloy	Zirconium ....35 to 40% Silicon .....47 to 52% Carbon .....max. 0.50%
"EM" Zirconium Briquets (Cylindrical Shape, Reddish Color)	Zirconium .....0.55 lb. Silicon .....1.90 lb. Total Weight .....5 lb.

"Electromet," "EM," "Mansiloy," "Simplex," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

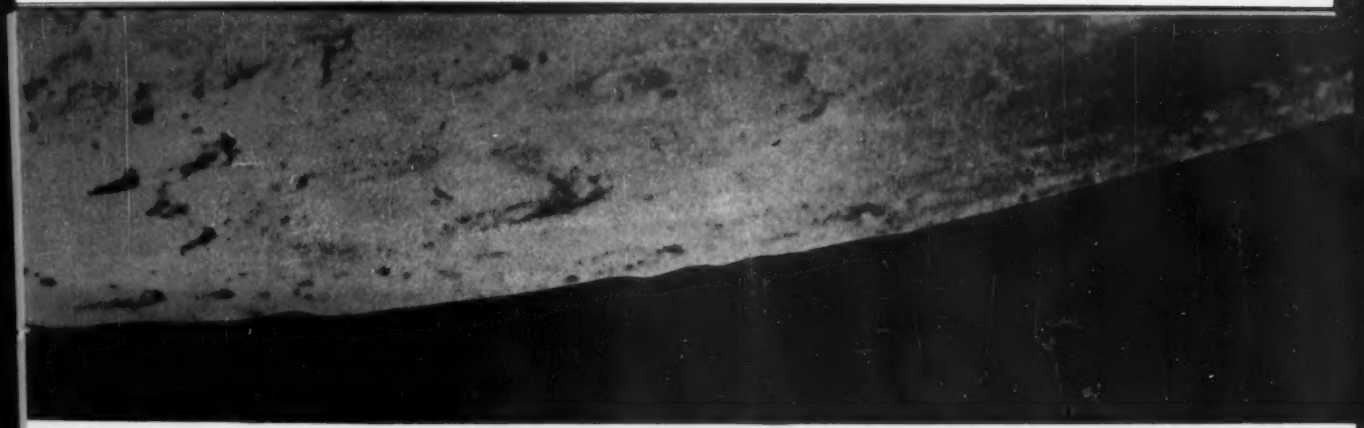
All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

Electro Metallurgical Company

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N.Y.



ONCE IN A BLUE MOON



Jones & Lamson is in the habit of coming up with excellent turret lathe developments, but only "once in a blue moon" do we offer so *many* at once.

All-out efforts in research and development have been turned towards designing machines that will reduce costs, increase production and keep both operators and management happy.

Here are some of the results:

We've developed simple "on-the-machine handling" with effortless and integrated control through Hydra-Clutch Headstocks and Geneva Saddles.

We've combined necessary horsepower with field-proven experience on how to use it.

We've combined two-way tracing with normal turret lathe operation.

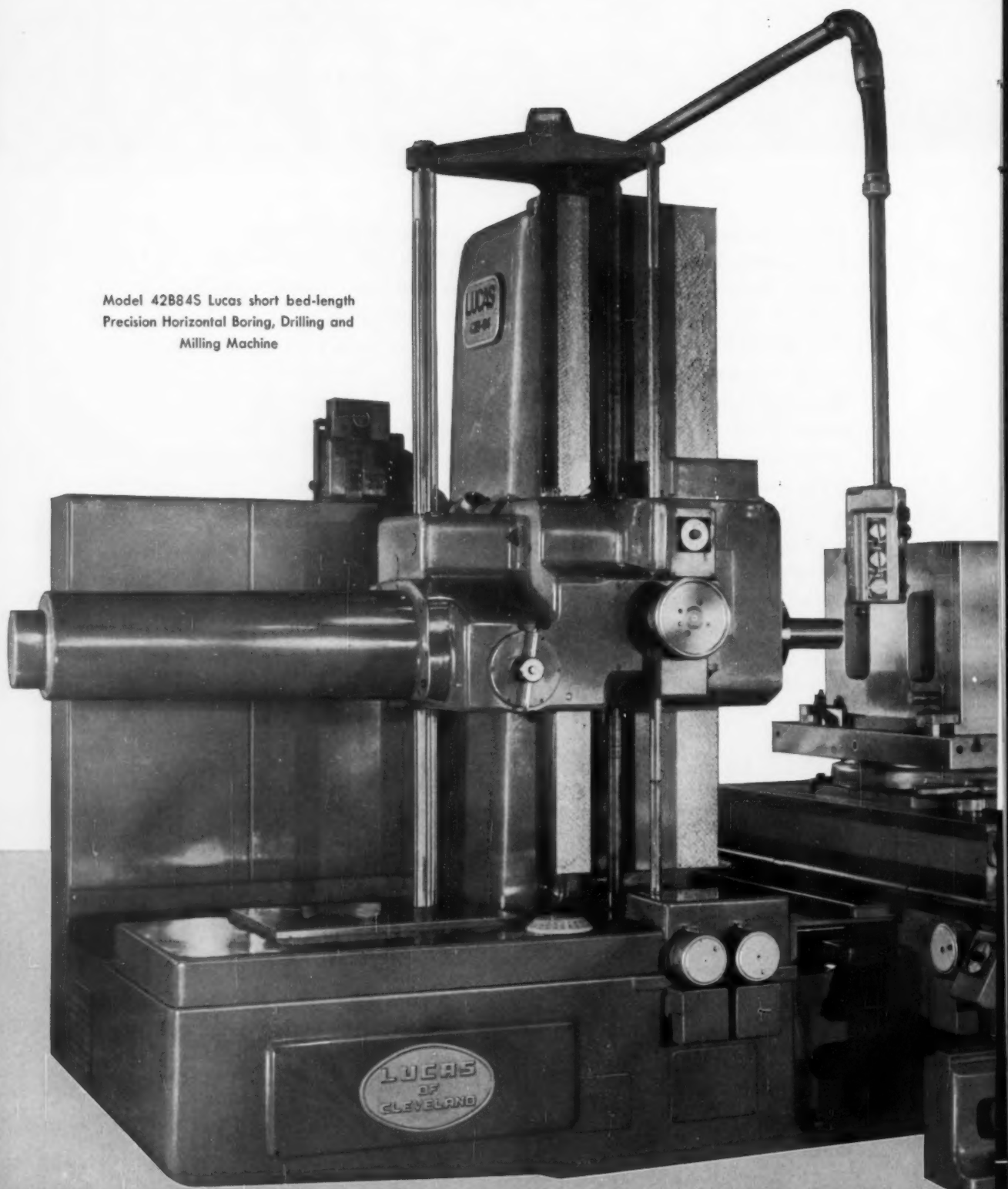
We've increased versatility and operation ease by means of tape-controlled turret lathes with pre-set tooling. Set-up is so quick it makes even "one piece" production as feasible as long run jobs.

We've perfected automatic thread chasing on standard turret lathes — thereby reducing idle time and increasing accuracy and production.

These and other engineering achievements are bound to help your plant operation. Write Dept. 710 today for literature and technical data.

JONES & LAMSON Machine Co., 511 Clinton St., Springfield, Vt.

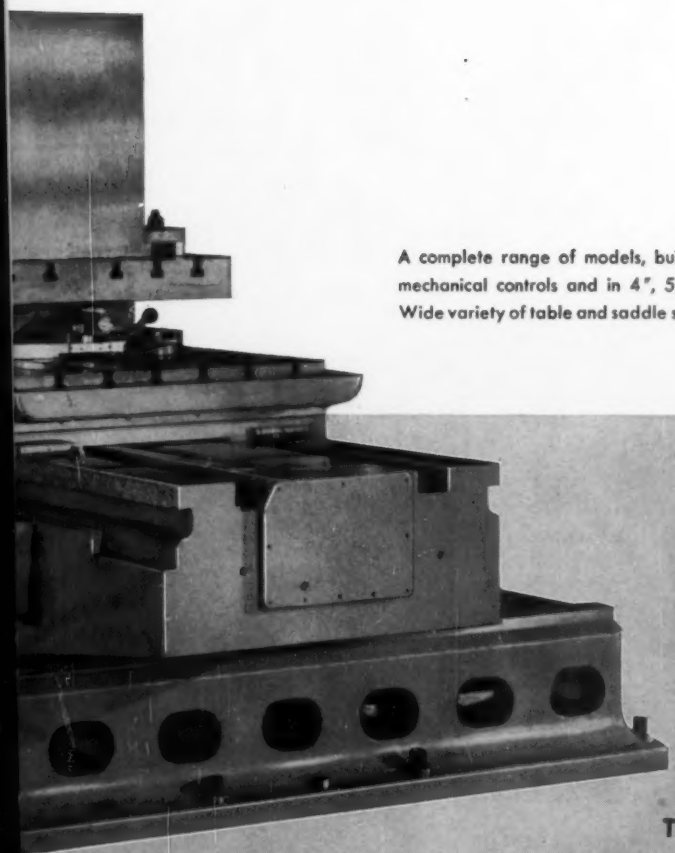
Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Thread & Form Grinders • Optical Comparators • Threading Dies & Chasers



Model 42B84S Lucas short bed-length
Precision Horizontal Boring, Drilling and
Milling Machine

more Lucas in less space

This new horizontal boring, drilling and milling machine is a space and money saver on work where a backrest is not required. Lucas leads the parade by concentrating all its efforts on horizontal boring machines—by constant improvement, by incorporating every advance immediately. Every worthwhile improvement will be found first in a Lucas. Lucas Machine Division • The New Britain Machine Company, 12302 Kirby Ave., Cleveland 8, Ohio.



A complete range of models, built in 3", 4" and 5" spindle sizes with mechanical controls and in 4", 5" and 6" sizes with electrical controls. Wide variety of table and saddle sizes with two- or four-way beds optional.

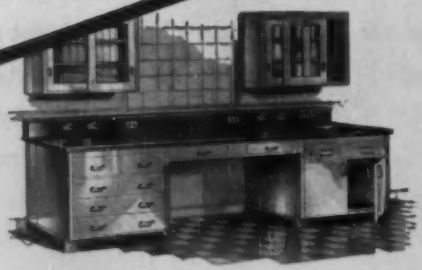
LUCAS
OF
CLEVELAND

A DIVISION OF
THE NEW BRITAIN MACHINE COMPANY

at **HAMILTON MFG. CO.**
Two Rivers, Wis.

Examining room equipment

Home laundry clothes dryer



Steel laboratory equipment

Accurate high production, at low cost, is maintained by a battery of Cincinnati Shears—in the manufacture of Hamilton automatic washers and dryers, hospital and laboratory equipment.

These money making Cincinnati features have brought results—

- Durable All-Steel Interlocked construction.
- Automatic Pressure Lubrication.
- Accurate Back Gauge.
- Powerful Hydraulic Holddowns.
- Inclined Ram.

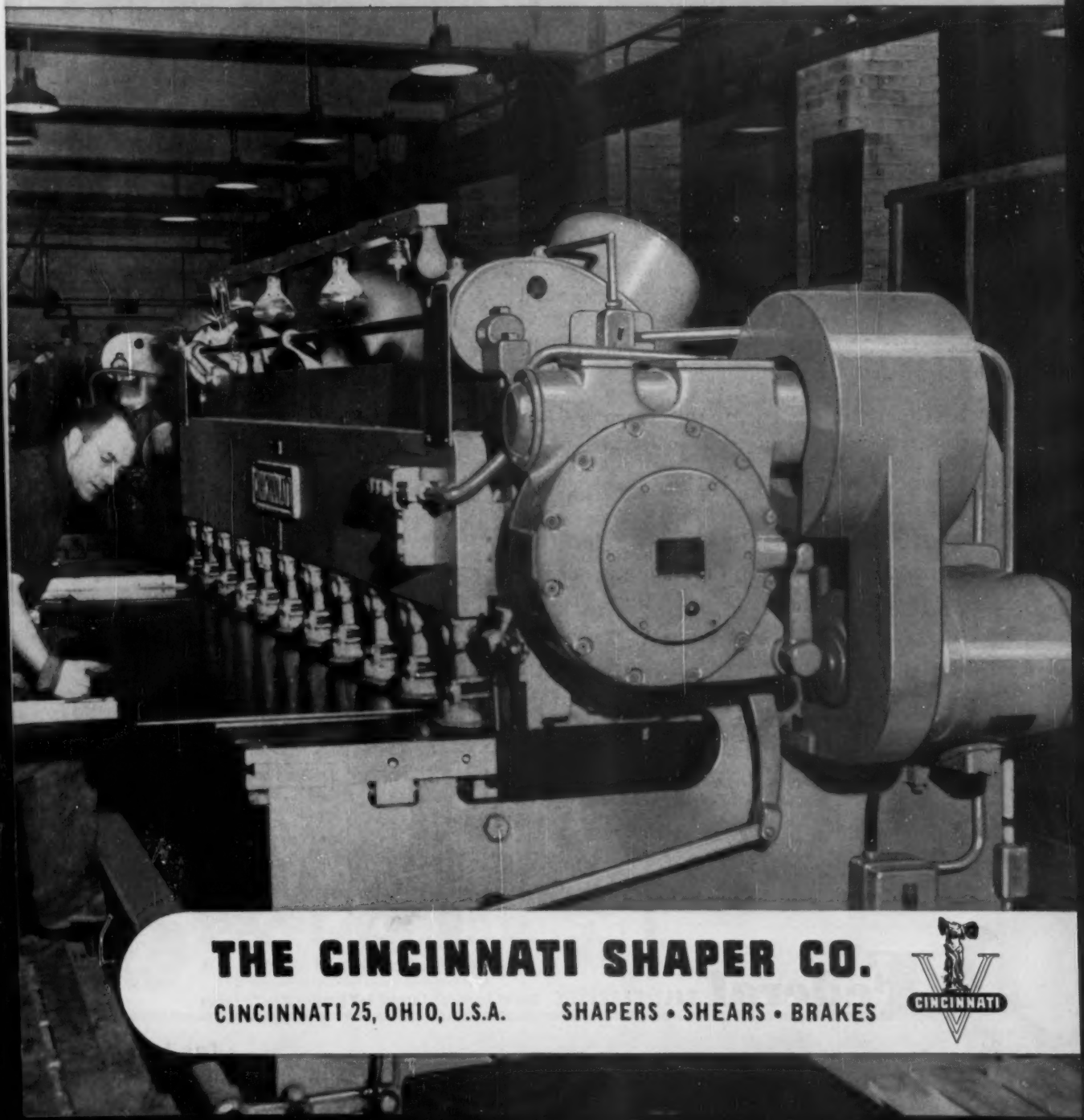
Cincinnati Shears accurately cut various thicknesses of material, without a change in knife clearance—this is a profitable time saver.

Photos courtesy the Hamilton Mfg. Company, Two Rivers, Wisconsin.

New front controlled power back gauges are now standard equipment on ALL CINCINNATI SHEARS.

Investigate these modern money making tools. Write for Catalog S-7.

...25,000,000 lbs. of steel sheared by cost cutting CINCINNATI SHEARS



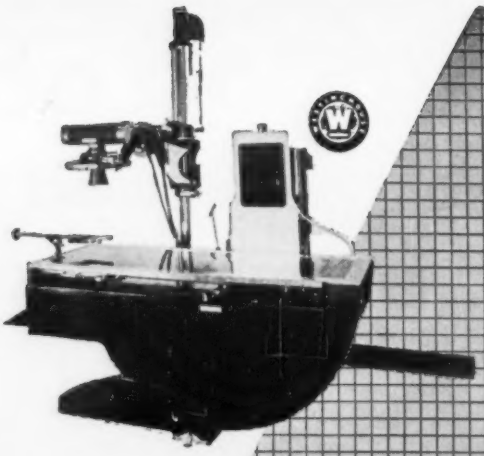
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

to save a life

X-ray tables require a precision all their own, for smooth, easy positioning. And, if you were to X-ray this Westinghouse Duoflex motor-driven table, you would see Federal Ball Bearings quietly at work here, too.



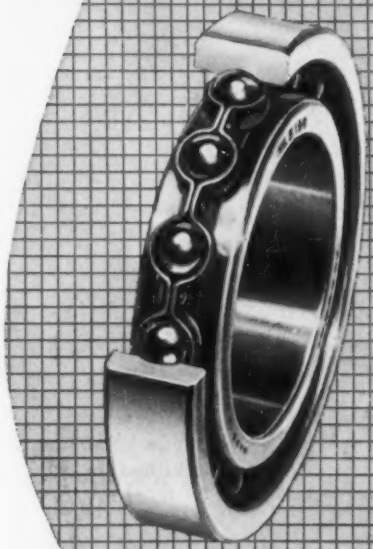
so much of industry *turns* on FEDERAL ball bearings

X-rays or escalators—hum of motors or heft of hoists—in the clinic or machine shop—Federal Ball Bearings do their quiet, anti-friction job. In your office, plant or home, you'll probably find some of the hundreds of types and 12,000 sizes produced by this 50-year-old manufacturer of ball bearings exclusively.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make*?

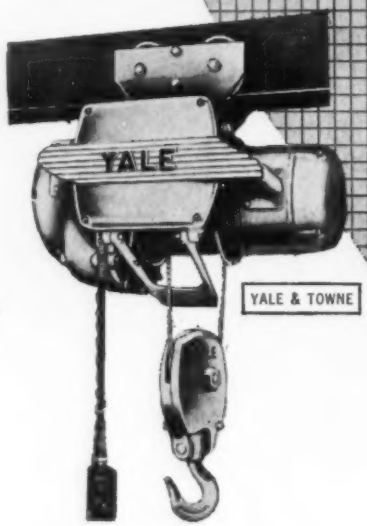
175 pages, chock full of data about ball bearings are yours for the asking in FEDERAL's new catalog. Just drop us a line for your copy.

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.



or lift a safe

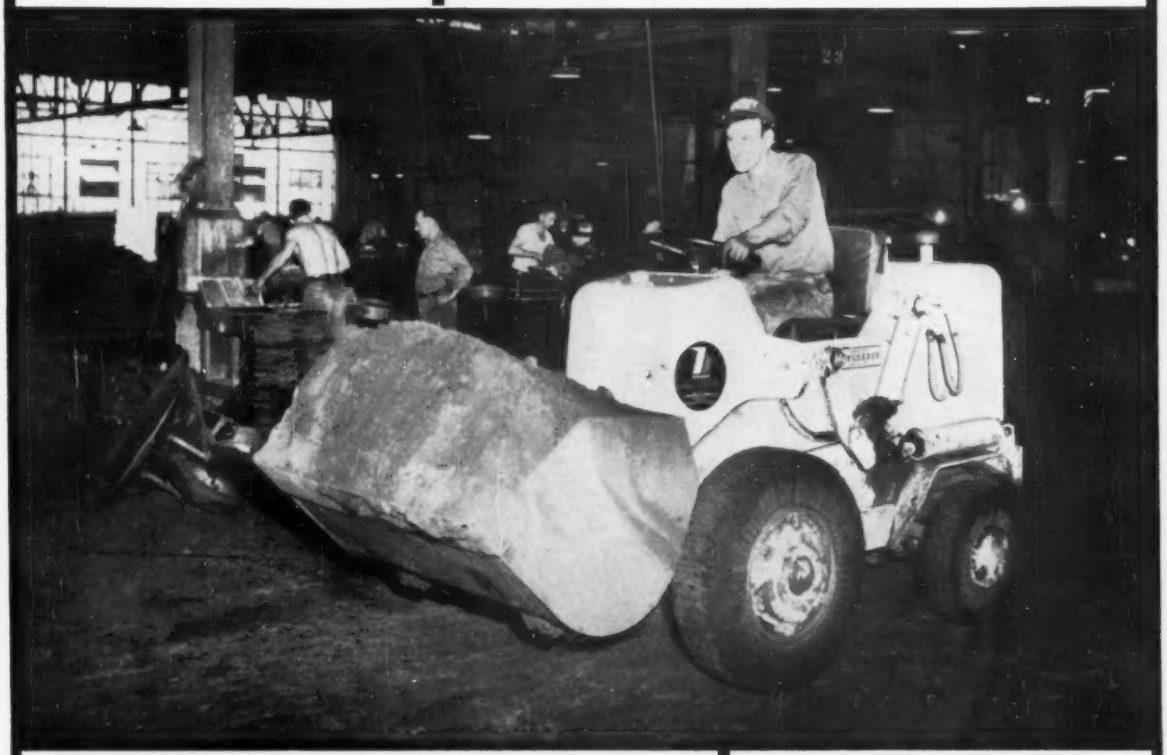
Husky electric hoists—capable of lifting and conveying up to 15 ton loads put a strain on bearings, too. In these mechanical "strong men", too, you'll find Federal Ball Bearings.



Federal BALL BEARINGS One of America's Largest Ball Bearing Manufacturers

30 TONS PER HOUR

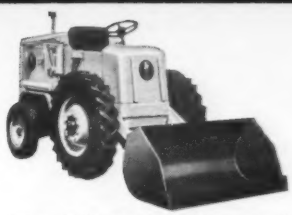
performance only a PAYLOADER® can deliver



This 1955 model HA is the youngest of three "PAYLOADER" units working at Pennsylvania Malleable Iron Corp., Lancaster, Penn. It is also the most productive tractor-shovel for its size that they have ever seen. Mr. E. F. Stolpe, the owner says, "Believe the new HA the best machine for our operations." It is used mostly for handling sand and coal — moves 30 tons per hour, 55 hours per week.

Hundreds of other owners of the new model HA are equally enthusiastic and pleasantly surprised by the superior performance and greater capacity of the new model HA. "Roll-back bucket carries more material" . . . "does the work of two machines on some operations" . . . "less spillage and practically no floor clean-up" are some of the actual comments from other owners.

It will pay you to find out what a "PAYLOADER" can do for your material handling problems. Your "PAYLOADER" Distributor is ready to show you. Use the handy coupon opposite.



For higher lifts and more capacity — the new model HAH 1 cu. yd. capacity

THE FRANK G. HOUGH CO.
733 Sunnyside Ave. • Libertyville, Ill.

- ☐ Send data on Model HA (18 cu. ft.)
- ☐ on new model HAH (1 cu. yd.)
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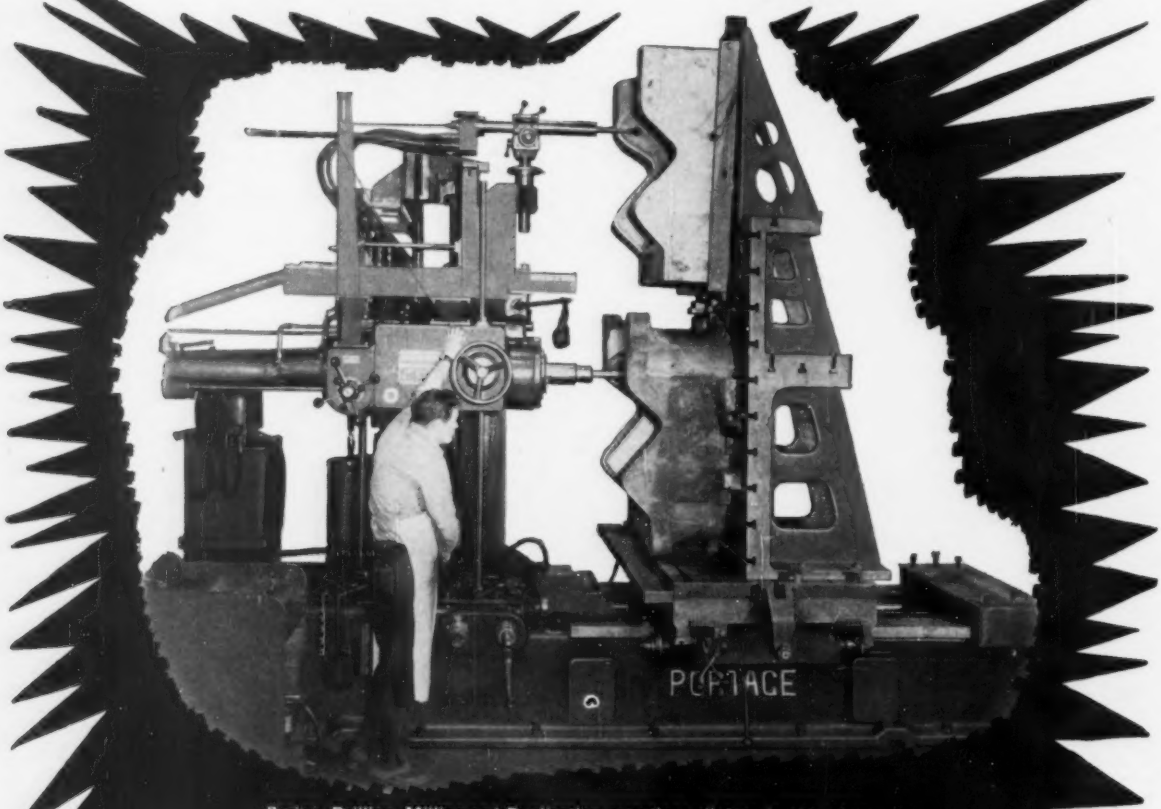
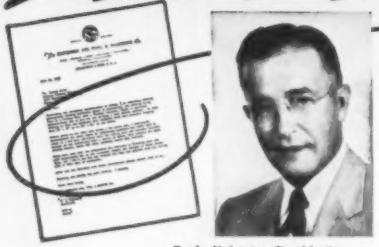
FROM BORING, MILLING, DRILLING to DUPLICATING

...all in ONE machine...from ONE source



Boring, Drilling, Milling and Duplicating operations all done in one set up
... one machine ... one operator, no loss of change over time.



P. J. Holstein, President
The Superior Die, Tool & Machine Co.
Columbus 7, Ohio

Read What One User Has to Say!

Portage Machine Company
1035 Sweitzer Avenue
Akron 11, Ohio

Gentlemen:

Before going in for this type setup, I completely investigated all other types of contouring machines and found that we could be a lot more universal with the Portage Boring Mill and Turchan Hydraulic Follower because we can accurately bore a series of holes, mill pockets and also outside bosses, where the other machines would only contour.

Today more than ever the die business is becoming more and more complicated due to the irregular shapes and designs of these stampings, and I don't see how any Tool and Die Shop can compete without having this type of equipment.

Yours very truly,
P. J. Holstein
THE SUPERIOR DIE, TOOL & MACHINE CO.

PORTAGE
THE BORING SPECIALISTS

THE PORTAGE MACHINE CO.

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Representatives in Principal Cities

BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916

...look into this bookfull

Sandvik's catalog gives thickness width, hardness, types of edges and weight in pounds per hundred feet. Also includes useful reference tables... Weights of Strip Steel, Comparative Table of Wire Gauges, Numerical Conversion Tables, Hardness Conversion Tables and a Temperature Conversion Table.

SANDVIK SWEDISH SPECIALTY SPRING STEELS ARE USED FOR:

Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical instruments, etc. • Razor Blades • Reeds • Shock Absorbers • A Wide Variety of Springs • Trowels • Vibrator Reeds • Piston Ring Segment and Expanders, etc.

SS-102

Sandvik's wide range of sizes and grades gives you a better chance of getting a steel that fits your application "like a glove".

You see, Sandvik's Catalog is literally a bookfull of answers to specialized steel requirements. It lists hundreds of sizes in various analyses of both cold rolled and bright annealed steels and hardened and tempered steels. Take a look. You can probably put your finger on the size, finish and physical performance that's exactly right for you.

Sandvik Swedish specialty strip steels are available:

- **In specialized analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—also slitting facilities available.**

Have the Sandvik catalog handy for present or future reference. A brief note on your letterhead, will bring you your complimentary copy.

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...the Miracle Metal ... LITHIUM

Lithium, like metallurgy, has come a long way. Once a laboratory curiosity, lithium is now the "catalyst of industry." Once the art of separating metals from their ores, metallurgy now embraces a whole new industry devoted to the manufacture and treatment of the alloys of these metals. And now—still another new field within a field—Lithium Metallurgy.

Lithium Ingots are used in the degasification of copper. Lithium Cartridges are used in the refinement of high temperature copper, and in brass, bronze and nickel-silver castings. Even the salts of lithium (Carbonate and Chloride, specifically) hold great promise for heat treating.

Lithium metal and its compounds could hold the same hope for *you*. We will be happy to discuss it at your convenience.

... trends ahead in industrial applications for lithium

LITHIUM CORPORATION OF AMERICA, INC.
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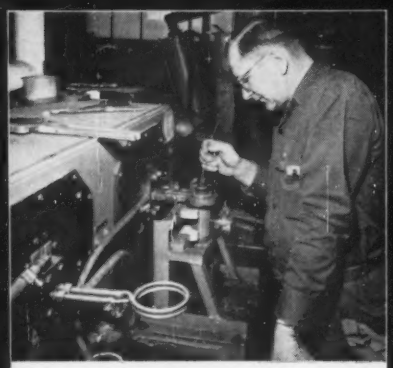
JACK & HEINTZ Saves $15.84 per hour...



Jack & Heintz Inc. silver brazes over 25 different parts on this 15 KW, 10,000 cycle TOCCO machine.

with TOCCO* Induction Brazing

Brazing Costs Down

When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from $.05 to $.006 each —a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

Brazing Production Up

While costs dropped, production on the part zoomed —from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

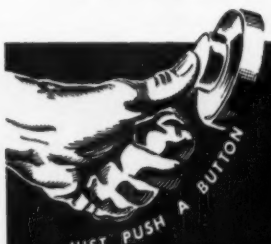
Versatility

The part shown is just one of over 25 parts, large and small, which alert J & H engineers have converted from old-fashioned brazing methods to modern, automatic TOCCO. Overall brazing costs (TOCCO brazing versus former methods used) are down 75%—brazing speed, up 100%.

* * *

If the manufacture of *your* product involves brazing, heat-treating, forging or melting of ferrous or nonferrous metals, don't overlook TOCCO as a sound method of increasing production, improving product quality and slashing costs.

THE OHIO CRANKSHAFT COMPANY



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NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-1, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

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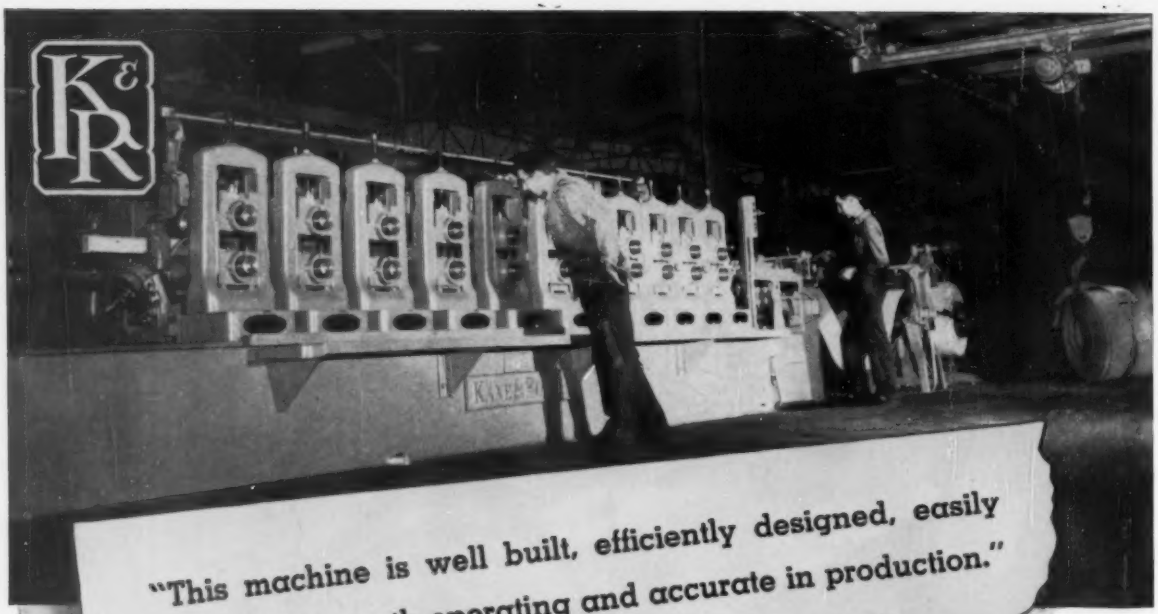

"This machine is well built, efficiently designed, easily adjusted, smooth operating and accurate in production."

writes Mr. W. F. Hinkle, Director, Engineering Division, Acme Steel Co.

ACME STEEL

Yes, Mr. Hinkle is perfectly satisfied to stamp "Acme Steel" on products rolled on a K&R Cold Roll Forming Machine. The section rolled here is a rectangular steel framing member. It measures 1⅜" x 2⅜" x .047 thick, made of low carbon, galvanized steel. The machine also forms this section from pre-enameled stock.

The work goes through on the K&R machine pictured above, from an Uncoiler through a Leveling Roll equipped with Pull-out Rolls to a Flying Cut-off and Punch. Cut lengths then pass into the Forming Machine.

Punching and shearing are both done at once — cutting and punching holes in the trailing end of one piece and the lead end of the next. Flat strip sheets on which this has been done are shown at left.

Machine consists of 11 forming stands on a 12-stand base — allowing for addition of another stand if needed later on.

✓ Learn how a K&R Forming Machine can cut costs and up production in your plant . . . write or wire today for engineering consultation.

69 Years of Metalworking Experience Built into K&R Machines:

Cold Roll Forming Machines
Bending Rolls — Straightening Rolls
Crimping Machines
Slitting Lines — Flying Shears & Saws
Hydraulic Tube Benders
Hydraulic Bulldozers — Hydraulic Presses
Edging Machines
Special Metalworking Equipment

KANE & ROACH
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Syracuse, New York
Established 1887

(Advertisement)

COMPLETE YOUR DATA FILES

S-200 REVIEW OF AIR GAGING
In "A Review of Pneumatic Dimensional Gages", Louis Polk, chairman and president of The Sheffield Corporation, describes the different types of air gages, their applications and uses. Amply illustrated with schematic drawings of pneumatic circuitry and photographs of multiple-dimension and automatic air gages. Contains selective bibliography on air gaging. 24 pages.

S-201 THEORY OF GAGING
Reprint from an address before the American Society of Mechanical Engineers, this six page technical paper reviews the operating principles of several types of mechanical, electrical, electronic and pneumatic gages. Many schematic drawings.

S-202 66 CENTURIES OF MEASUREMENT
Commemorative booklet issued at the time the permanent exhibit of precision measuring instruments was established at the Smithsonian Institution, Washington, D. C. Includes 16 colored drawings depicting significant periods and advancements in the history of measurement since 4700 B.C.

S-203 VISION IN METROLOGY
Printed from an address by Louis Polk, this pocket size booklet tells the story of measurement from the Cubit of the ancients to the "Barn" of the atomic age. In conclusion, the author presents some stimulating thoughts about the methods for dimensional control in the future.

S-204 ELI WHITNEY METROLOGY LABORATORY
This pocket-size booklet describes the construction, Inspection environment, and instrumentation in Sheffield's newly opened laboratory for precision measurement. Lists the types of Measurement and Inspection services available to Industry including Gage Block and End Measure Calibration, Hardness Testing, and Surface Finish Analysis.

S-205 CATALOG
Twelve page, easy-to-read catalog containing application and engineering data on standard Sheffield control units for automatic machine control, gaging, classifying, and segregating processes. Many photographs and diagrams of typical automated production processes.

S-206 THE SHEFFIELDER
A 4-page newspaper written for shop, production, and inspection personnel. Mailed free-of-charge 4 to 6 times a year. Contains feature articles and photographs on new gages and inspection instruments, better inspection practices, and news from Sheffield's Machine Tool Division.

S-207 GENERAL CATALOG
New 16-page, fully illustrated General Catalog of Sheffield Precision Products and Services. Included are Thread and Form Grinders, Annular Form Grinders, Crushtrue Grinding Machines, Threading Machines, Taps, Chasers, and Ultrasonic Machine Tools; also, Precisionaire inspection gages, Automatic and Multiple dimension gages, Toolroom and Inspection Instruments, and Contract Services.

S-208 NON-CONTACT X-RAY GAGE
A 16-page catalog describing the Sheffield "Measuray"—a non-contact X-Ray gage for continuous or intermittent measurement of strip or sheet stock while in motion or stationary—hot or cold. Contains models and capacity ranges as well as types of materials on which it can be used.

S-209 PRECISIONAIRE INSTRUMENTS
This 30-page catalog and price list on Precisionaire column-type air gages contains the full line of base instruments, with their amplifications and scales, and complete lists of standard sizes and types of air spindles, air snaps, Plunjet gaging cartridges, and types and sizes of adjustable air tooling.

S-210 PLUNJET GAGING CARTRIDGES
A 24-page catalog showing types, sizes, amplifications, tolerance and ranges of Sheffield Plunjet gaging cartridges. Contains engineering and technical data on the use of Plunjets to single and multiple dimension inspections and for machine control applications.

S-211 AIR GAGING JET ENGINE BLADES AND BUCKETS
The critical dimensions and conditions of jet engine blades or buckets and how they are gaged quickly and accurately with Sheffield Precisionaire gages are described in this 28-page catalog.

S-212 ADJUSTABLE AIR GAGE TOOLING
Engineering Data Sheets describing types and sizes of adjustable air gage tooling for use with Precisionaire instruments and other makes of air gages. Gages for measuring inside diameters include four adjustable spindles with ranges from ⅜" to 9/16", 9/16" to 1", ¾" to 1 ½" and 1 ½" to 3"; also, the adjustable Airebore Gage Kit for any size bore from 3" to 12", and the 1" to 3" adjustable Balljet spindle kit. Standard 1" adjustable Plunjet Snap gages are available covering the range from 0" to 12".

S-213 AIRETEST INDICATOR
An 8-page Engineering Data Sheet covering the use of the Sheffield Airetest Indicator with the column type Precisionaire. It describes how this new style pneumatic pickup unit is used to accurately determine height, flatness, parallelism, and concentricity.

S-214 PLUNJET STEEL AND STONE FLATNESS GAGES
This Engineering Data Sheet shows how a Plunjet gaging cartridge applied to either a steel or stone surfaceplate makes an ideal combination for checking flatness to a high degree of accuracy.

S-215 PLUNJET EXTERNAL GRINDING GAGES
Engineering Data Sheet showing how a Plunjet gaging cartridge is used with Foster and Arnold Visual Grinding Gages to indicate stock removal evenly without oscillation or flicker normally associated with a dial indicator reading.

S-216 CRUSHTRUE WHEEL DRESSING PROCESS
What Crushtruing is and how it can be used is told in this 12-page catalog. Contains types and sizes of Crushtrue devices available for both surface and cylindrical grinders, and information on their selection. Many case histories and illustrations.

S-217 PRECISION THREAD AND FORM GRINDERS
Machine information and specifications catalog on Models 101, 103, 105, and 107 Precision Thread and Form Grinders. All models capable of plunge grinding.

S-218 MODEL 109 PRECISION ANNULAR FORM GRINDER
Use and specification information on this grinder which has a capacity of 12" between centers and will grind a maximum diameter of 4" with a 14" wheel, and will accommodate work up to 7" in diameter.

S-219 MODEL 180 CRUSHTRUE MULTI-FORM GRINDER
An 8-page catalog covering machine features and specifications of new model 180 Grinder. This machine uses a 4" wide Crushtrue dressed wheel and will grind work up to 10" in diameter and will accommodate a workpart 24" long. Features automatic grinding and gaging, automatic Crushtruing and automatic compensation for wheel wear after dressing.

S-220 MODEL 134 PRECISION THREAD AND FORM GRINDER
Both single and multi-pass models are described in this 8-page catalog. Model 134 is used to grind threads up to ½" diameter x 4" long within a pitch range from 20 to 120 T.P.I. Machine features include automatic grinding cycle, automatic wheel dressing, and automatic compensation.

S-221 MICRO-FORM GRINDERS
An 8-page catalog with inserts covering Sheffield's Micro-Form Grinders. These machines grind circular and flat form tools, templates, profile gages, cams, and Crushtrue rolls, etc., directly from a drawing of 50:1 ratio. Neither templates nor masters are required. Work is checked without removing from machine.

S-222 MODEL 140 GEAR GRINDER
An 8-page catalog containing machine and specification information on this reciprocating type gear grinding machine that is used to produce precision ground helical and spur gears from 8 to 50 inch. Crushtruing is used to from the grinding wheel to the basic rack form. Maximum work diameter is 8" and grinding stroke 4".

S-223 GEAR DEBURRING MACHINES
Machine features and specifications of seven models of gear deburring machines are described in this 8-page catalog. Both single and two station models are included.

S-224 GEAR AND SPLINE DEBURRING MACHINES
Six standard models and their specifications are included in this 8-page catalog. These machines are used for precision chamfering, tooth rounding or pointing of gears and splines. Gears up to 13" in diameter can be handled on standard machines—larger on special.

S-225 MACHINING THE UNMACHINABLE
A 16-page booklet describing the techniques, advantages, uses and machines for ultrasonic machining of hard materials such as carbides, glass, and ceramics.

S-226 AUTOMATIC WELDING MACHINES
A 4-page Engineering Data Sheet describing both Point and Disk type welding machines that are used for automatic welding of point and disk shape contacts of precious and semi-precious metals to small contact arms, leaf springs, and instrument components. Examples of metals that can be welded are gold, silver, platinum, palladium, and iridium.

S-227 THREADING TOOLS — TAPS AND DIE HEADS
A 16-page catalog showing a large variety of types and sizes of the threading tools available from the Murchey Division of Sheffield. Included are collapsible taps and self-opening die heads, solid taps, chasers, and chaser accessories for setting and grinding.

S-228 PRECISION THREADING UNIT — PRECISION-PAK
The Sheffield PRECISION-PACK, a self-contained precision threading unit that can be used also for boring, chamfering, and reaming is described in this 4-page folder. Threading capacity: Internal—1 ¼" to 4"; External ¾" to 4"; Maximum pitch 8.

S-229 THREAD ROLLING ATTACHMENT — PRECISION-ROL
A 4-page folder covering five standard models of PRECISION-ROL thread rolling attachments for automatic screw machines and turret lathes. Many case histories with threading production times included.

S-230 VISUAL GAGES
A 20-page catalog on the "Shop Proof" Visual Gage—an indicating comparator which is set by precision gage blocks or master gages. Includes types, sizes, amplifications, accessories, and their use in receiving, production, and final inspection.

S-231 ELECTRONIC GAGE BLOCK COMPARATOR
Engineering Data Sheet covering the Sheffield Electronic Gage Block Comparator that is used to calibrate gage blocks to reference masters to a certified accuracy of several millionths of an inch. Available with dual amplifications of 50,000/200,000, 10,000/100,000 or 10,000/20,000 to 1.

S-232 ELECTRONIC HEIGHT INDICATOR
Engineering Data Sheet on this Height Indicator that has a vertical range 0" to 26" and standard amplification of dual 1,000/2,000 to 1.

S-233 ELECTRONIC LEAD MEASURING INSTRUMENT
A 4-page Engineering Data Sheet describing an Electronic Leadchek which will handle work up to 36" between centers and a maximum diameter of 10". Standard remote Electronic Amplification, 2,000 to 1.

S-234 ELECTRONIC INTERNAL MEASURING INSTRUMENT
A 3-page Engineering Data Sheet covering Type N-6 Internalchek used to inspect master and ring gages and other high precision work for size, taper, b'ellmouth, and out-of-roundness. Standard inspection range .370" to 12", with a vertical range up to 1 ½". On special order, diameters down to .240" can be inspected.

S-235 DIMENSIONAL CONTROL AND GAGING POLICY
A 40-page booklet containing important information for inspection personnel on gages and gaging policy, gagemakers' tolerances, unilateral and bilateral gage tolerances, and the care, control and use of gages. Also, included are diagrams and charts on Unified and American Standard Screw Threads.

THE SHEFFIELD CORPORATION
Dayton 1, Ohio, U. S. A.

7329

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THE SHEFFIELD CORPORATION
Box 893, Dayton 1, Ohio Div. C Date_____

Gentlemen:
Without obligation, send me the numbers circled above.

NAME_____
DEPT._____ POSITION_____
COMPANY_____
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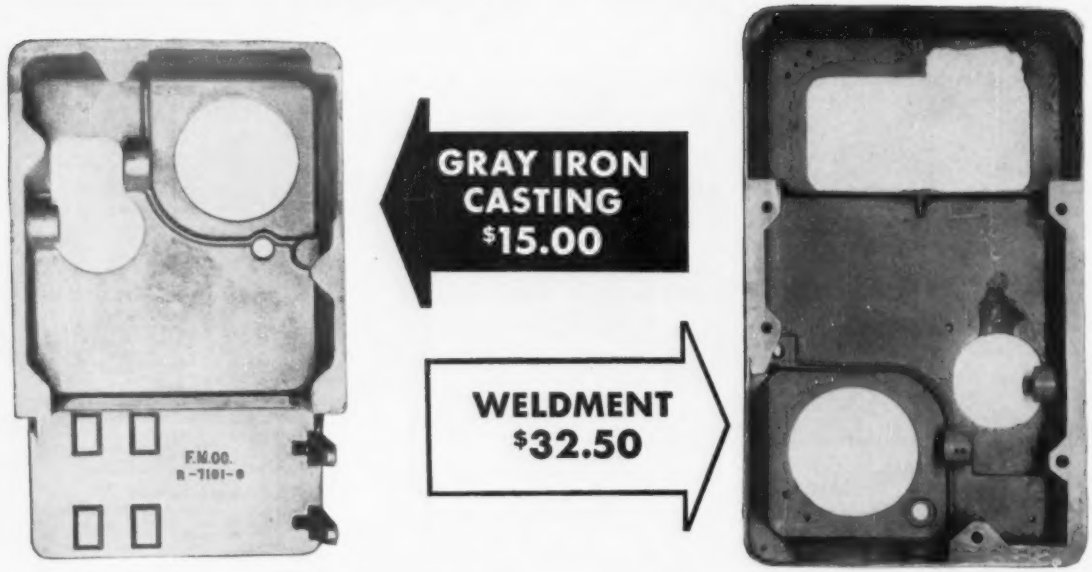
CITY_____ ZONE____ STATE_____

Case History No. 36 • SPLASH TRAY



Pilot-Model Weldment points way to 53% SAVING IN GRAY IRON

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

Admittedly, it's sometimes desirable to make pilot models by welded fabrication. However, when the model proves itself and is ready for production, you can usually make important savings by using *Gray Iron castings.*

In the above case, these splash trays were being fabricated and assembled with a bolted-on motor mounting bracket. Then Gray Iron castings were specified, and *savings amounted to $17.50 per tray!* The casting added desired rigidity, dampened vibration and provided more than adequate strength. Also, the motor mount—cast integrally—eliminated an assembly operation.

Perhaps there are examples in your own production setup where conversion to Gray Iron from a fabricated pilot model has been overlooked. Look at that part again, and consider the savings and other advantages to be gained by *casting* it in Gray Iron.

Write to the Society for technical answers to such questions, or for business information regarding castings. The Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

GRAY IRON FOUNDERS' SOCIETY

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HIGH SPEED BLANKERS—
Cir. No. 915-N-2

Detailed information on 2 sizes of presses for mass production blanking, piercing, shallow drawing and forming. Speed range 300 to 900 rpm. Shows machines from several angles, gives close-ups of design details and pictures typical work samples. Complete specifications included. 8 pages.

TANDEM ROD MILLS—
Cir. No. 729-R

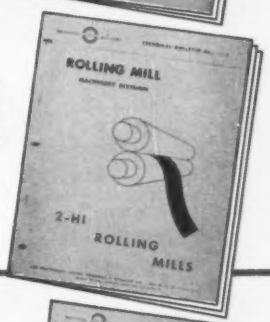
8-pager on mills for high speed reduction of non-ferrous and ferrous rod. Shows various sizes of mills plus work samples and a cross-sectional reduction sequence. Tells how mill can reduce operating costs. Also discusses pay off unit, straighteners, coilers and cooling method. Table gives capacities and other data.

MULTIPLE PLUNGER PILLAR PRESSES—
Cir. No. 754-N-2

8-page illustrated booklet presents latest features in WF multiple station pillar presses. Gives specifications and capacities for six sizes. Shows typical work samples and also covers accessory equipment.

2-HI ROLLING MILLS—
Bul. No. 111-R

Gives general information on wide variety of 2-Hi mills for cold or hot rolling. Rolls range from 5" dia. to 24" dia. Pictures five different sizes.

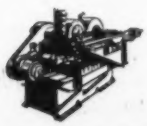


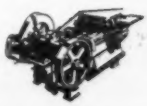
INCLINED, SHELL THREAD ROLLING MACHINE—
Cir. No. B33-EL-2

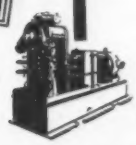
Describes and illustrates automatic inclined shell threader for attachment to eyelet machine or with independent feed. Covers use, construction, operation and drive. Shows work samples and has table of specifications.

WIRE FLATTENING MILLS—
Bul. No. 110-R

Gives information on mills with production speeds approaching 3,000 FPM. Shows various sizes. Rolls range from 4" dia. to 12" dia. Includes data on edgers, pay-offs, winders, drives, coolant system, etc.


BOLT, NUT & SCREW MACHINERY


POWER PRESSES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☐ 915-N-2 ☐ 754-N-2 ☐ 833-EL-2
☐ 729-R ☐ 111-R ☐ 110-R

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Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws . . . B-RIGHT-ON service.

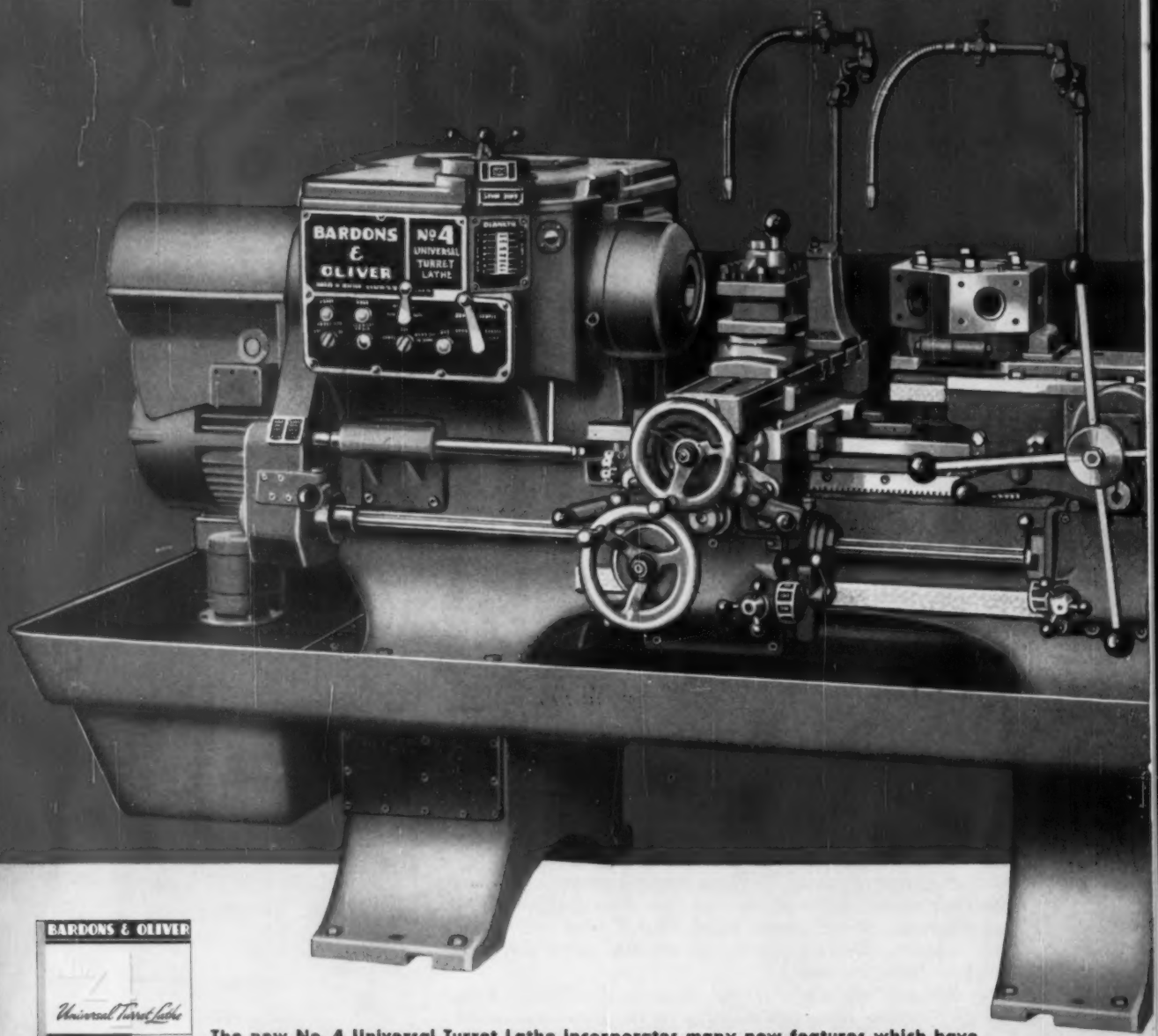
Write for descriptive literature . . . see how

YOU CAN DO BETTER WITH B-RIGHT-ON.

THE BRIGHTON SCREW & MANUFACTURING CO.

1829 READING ROAD CINCINNATI 2, OHIO

THE NEW BARDONS & OLIVER No. 4 Universal Turret Lathe...



Write us on your company's letterhead for this new Catalog.

The new No. 4 Universal Turret Lathe incorporates many new features which have sharply increased its productive capacity while lessening the physical effort required of the operator.

A larger selection of spindle speeds, covers a wider overall range. Spindle speeds are instantly preselected and changed. Tool carrying stations have increased rigidity and accuracy. Controls are regrouped for handier and faster manipulation. Wider selection of feeds are provided with positive jaw feed clutches and easier engagement levers.

Power transmitting capacity is adequate to accommodate motors of ample horsepower for the latest developments in cemented carbide tooling.

We welcome the opportunity to quote production estimates on individual requirements.

Features:

- Sixteen Geared Spindle Speeds, providing a fifty to one speed range.
- Three optional spindle speed ranges with maximum up to 2000 R.P.M.
- Constant Horsepower (optional to fifteen) at all spindle speeds.
- Fast operating and effortless Electric Headstock Clutches.
- Fully Automatic Spindle Speed Changing.
- 100% anti-friction bearing headstock and aprons.
- Flanged Type Motor Mounting with reduced overhang.
- Diagonal Cross Ribbing full length of bed and underneath headstock.
- Replaceable Bed Ways of Solid Hardened and Ground Alloy Steel.
- Replaceable Hardened and Ground Steel Turret Slide Saddle Ways, Gibs, and Top Caps.
- Large Hexagon Turret and deep Turret Slide of exceptional accuracy and rigidity.
- Twelve Quick Feed Changes for Cross Slide, Carriage and Hexagon Turret.
- Single Dial Feed Selectors on both Aprons.
- Positive Tooth Feed Clutches with "Easy Action" Engagement Levers.
- Sealed Carriage and Saddle Aprons.
- "One Shot" lubrication of all Tool Slide Ways.
- Accurate and Rigid Square Turret Sealed by Protective Skirt.
- Large Hardened and Ground-in-Thread Ball Bearing Cross Slide Screw.
- Anti-Backlash Adjustable Nut on Cross Slide Screw.
- Built-in Bar Feed Stop providing extra Turret Tool Station.
- Faster Hydraulic Bar Feed and Collet Chuck.
- Only one Bar Feed Setting for a full length of Bar Stock.
- Impeller Type Coolant Pump with Integral Motor Drive.
- Optional Collet Chuck Capacities (2″ or 2½″ diameters).

MANUFACTURERS OF TURRET LATHES AND CUTTING-OFF LATHES

BARDONS & OLIVER, INC.

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We have just one point to make—

When it comes to **ELECTROPLATING** and allied operations, one name means most to the men who buy . . . **H-VW-M** . . . the manufacturer who supplies every major requirement in processes, equipment and supplies.

Single source? . . . Yes, and what's more important—single responsibility.

PLATEMANSHIP is H-VW-M's unique combination of: the most modern and complete laboratory for testing and development . . . the ability to provide complete equipment and supplies for every plating and polishing need . . . the complete background of knowledge and experience in every aspect of plating, polishing, cleaning and anodizing.

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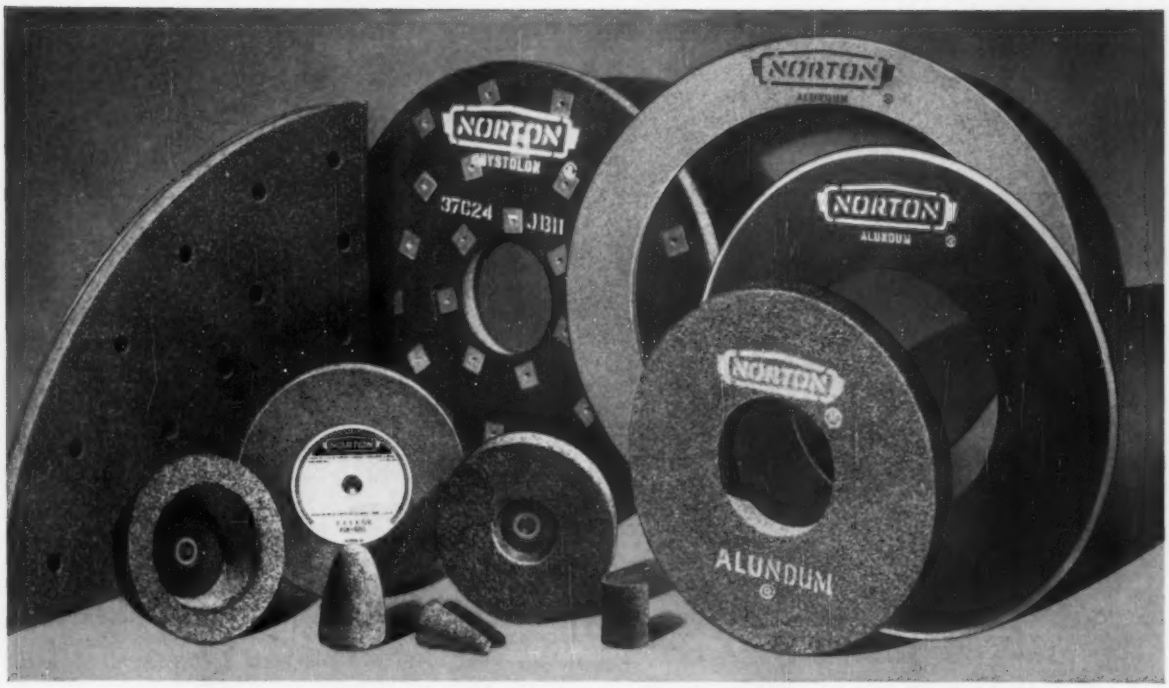
INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES · EQUIPMENT · SUPPLIES



Q. What's new in grinding?

A. B-11 resinoid-bonded wheels —for many grinding jobs

Q. What's new about B-11 wheels?

A. Their great new resinoid bond, improved uniformity and balance, new "TOUCH of GOLD" performance-benefits

Q. What is the B-11 bond?

A. It's the latest Norton resinoid bond. Wheels made with it are excellent for snagging, disc grinding, heavy weld grinding, thread grinding, cam grinding, centerless grinding, roll and surface grinding.

Q. Why?

A. Because B-11 wheels are more uniform in structure, with better balance. As a result, they grind cooler and faster. And on portable machines they "hug that work" closer, with less vibration and bounce.

Q. What about those "Touch of Gold" benefits?

A. They're the direct result of the B-11 wheels' more efficient grinding action. In precision grinding this means improved surface finish, greater accuracy, more pieces per dressing. In rough grinding it means less operator-fatigue and longer wheel life. All these benefits add up to more profitable grinding for you.

Q. Any other advantages of B-11 wheels?

A. Many others. For example you get closest possible duplication. Hardness increments are evenly spaced throughout the entire grade scale. And B-11 wheels can be supplied in half-grade increments, making it even easier for you to choose exactly the right wheel for every job.

Q. Sounds fine— what about more information?

A. Your Norton Distributor will gladly give you the whole story on the new B-11 wheels. Or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1778

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Making better products... to make your products better

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
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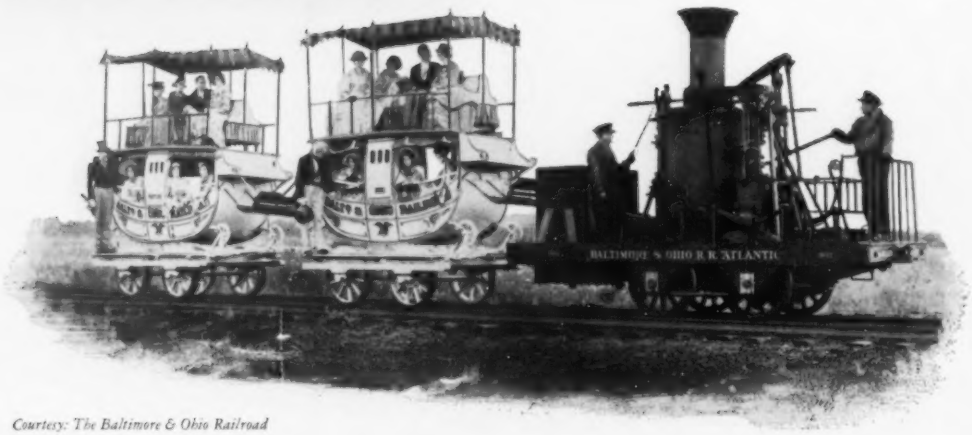
FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

HAND IN HAND THEY GREW...



Courtesy: The Baltimore & Ohio Railroad

As the need for heavier railroad rails grew, so did the iron industry. The first railroads began with wooden rails which were iron-topped. It was not until 1844 that "heavy", entirely iron rails went into production at the Mt. Savage Rolling Mill in Allegheny County, Maryland. It was 21 years later, in 1865, when the first steel rail was rolled from a Bessemer ingot at the North Chicago Rolling Mill Co.

One of the first "iron horses" to snort flame, belch smoke and cinders, and scare livestock was the "Atlantic". Built in 1832 by Phineas Davis in York, Pennsylvania, the "Atlantic" was placed into operation by the Baltimore & Ohio Railroad. In 1835 the "Atlantic" led a procession of trains into Washington, D. C.

As have the railroads and the iron and steel industries grown, so has BAKER'S MAGDOLITE, the original dead-burned dolomite. By continually improving their product through constant testing, today BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Economy, Strength, Quality. Specify BAKER'S MAGDOLITE, the original dead-burned dolomite, the next time you need dolomite.

6-55

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

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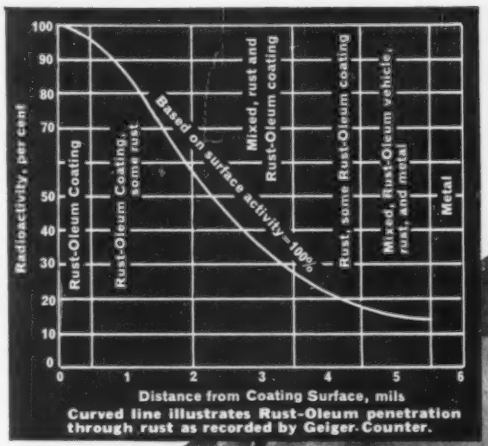
RUST-OLEUM®

PENETRATION

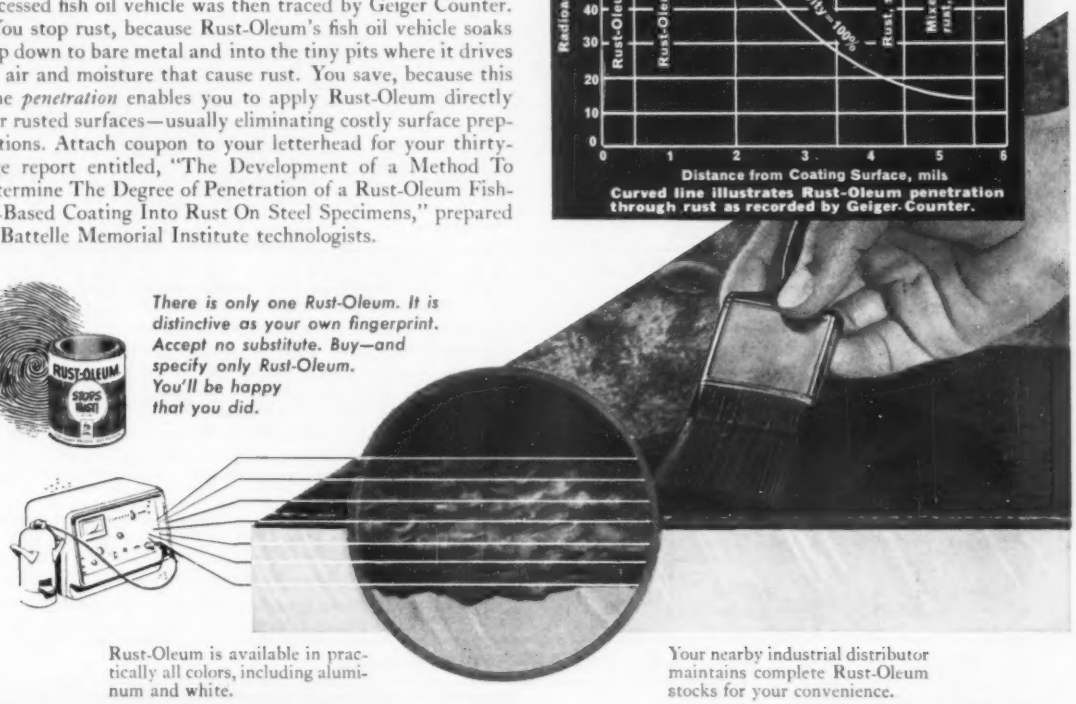
through rust to bare metal traced by Geiger Counter. To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* to bare metal by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same *penetration* enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



Curved line illustrates Rust-Oleum penetration through rust as recorded by Geiger Counter.

There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your nearby industrial distributor maintains complete Rust-Oleum stocks for your convenience.

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STOPS RUST!

See our Catalog in Sweets, or write for complete information.

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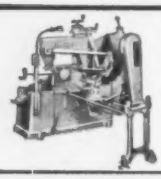
Metal Sawing is of many types

Requiring, for efficiency, sawing machines of varying characteristics, capacities, feed pressures, speeds . . . even different blade actions. The complete MARVEL Line comprises various basic types of metal sawing machines to meet the requirements of all shops.

Engineered to your jobs by a MARVEL Sawing Engineer, a MARVEL Saw is certain to lower your sawing costs (both blade cost and cost per piece); to cut-off more accurately (both in length and squareness) and to out-produce any other sawing machine of comparable specifications.

PRODUCTION HACK SAWS

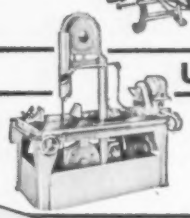


TYPE	CAPACITY	MODEL	GENERAL APPLICATION
HACK SAW Single Cut	6″ x 6″	No. 6	These machines embody all of the modern design features of fine machine tools. They are recommended for constant heavy duty service, cutting all types of machinable metals. They should be selected whenever the work demands speed, accuracy, and stamina.
	10″ x 10″	No. 9	
HACK SAW Automatic Bar Feed	6″ x 6″	No. 6A	These automatic MARVEL saws use the No. 6 and No. 9 as a basic unit, but are modified to include an automatic mechanical bar feeding mechanism. Their purpose is to automatically "cut-up" long bars into multiple short length pieces without constant attention of an operator.
	10″ x 10″	No. 9A	
HACK SAW Dual Bar Feed	10″ x 10″	No.9A3	The No. 9A3 machine combines full automatic operation and manually controlled power bar feed, the latter for lengths beyond practicability of full automatic operation.
HACK SAW Hydraulic Roll Stroke Single Cut	18″ x 18″	No. 18	These big saws are proof that the hack saw method is the most practical for cutting off big pieces of the toughest steels. Low investment, economical operating and maintenance cost, accuracy and cutting speed make these machines an ideal tool for the steel mill, warehouse and forge shop.
	24″ x 24″	No. 24	
HACK SAW Power Work Handling Type	18″ x 18″	No.18B	The No. 18-B is a special structural saw, primarily designed to obtain accuracy to such a degree in cutting structural shapes that subsequent face milling is not required.

GENERAL PURPOSE HACK SAWS

TYPE	CAPACITY	MODEL	
HACK SAW Single Cut	6″ x 6″	No. 4B	This saw is fast, accurate, yet moderately priced. For intermittent service, to cut off all types and shapes of machineable metal. Recommended for use in the tool room, maintenance department, and machine shop.
HACK SAW Single Dry Cut	4″ x 4″	No. 1	The most popular mechanical saws on the market for occasional cut-off work. Sturdily built, easy to operate, low in price, they are ideal for the small shop where speed is not essential.
	6″ x 6″	No. 2	

UNIVERSAL BAND SAW



TYPE	CAPACITY	MODEL	
BAND SAW	18″ x 18″	No. 8	The MARVEL No. 8 Band Saw is designed primarily for universal work. It will trim, miter, notch and cut-off bar stock, pipe, structural sections, mouldings and tubing. No other saw of any type is capable of handling the wide range of unusual cutting jobs possible on this very versatile machine.

HACK SAW BLADES—*High-Speed-Edge*

COMPOSITE UNBREAKABLE

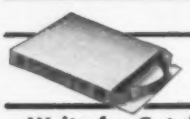
The original composite blade with a fast-cutting, long-lasting high speed steel cutting edge integrally welded to a tough, non-breakable alloy steel body. These superior blades improve the efficiency of ANY hack saw machine because they will withstand heavier feed pressure, higher tension, and faster speeds. A type and size for every hack saw, for every machineable material.

HOLE SAWS—*High-Speed-Edge*

HEAVY DUTY FOR MACHINE TOOLS

Permit sawing-out of large holes (to 5½″ dia.) in steel plate (to 1¼″ thickness) with small capacity machine tools and portable tools. Heavy duty arbors and 1-piece floating, self-aligning, High-Speed-Edge saws. This new type hole saw, developed by MARVEL, provides a fast, low-cost method for making large holes, an operation previously requiring much machining or large equipment.

BAND SAW BLADES



WELDED TO SIZE INDIVIDUALLY PACKAGED

Through exhaustive tests MARVEL has determined the type of set—raker or wavy—best suited for all-around cutting on every standard make and model metal band saw. These exactly suited blades come welded to size, ready for use, and individually packaged.

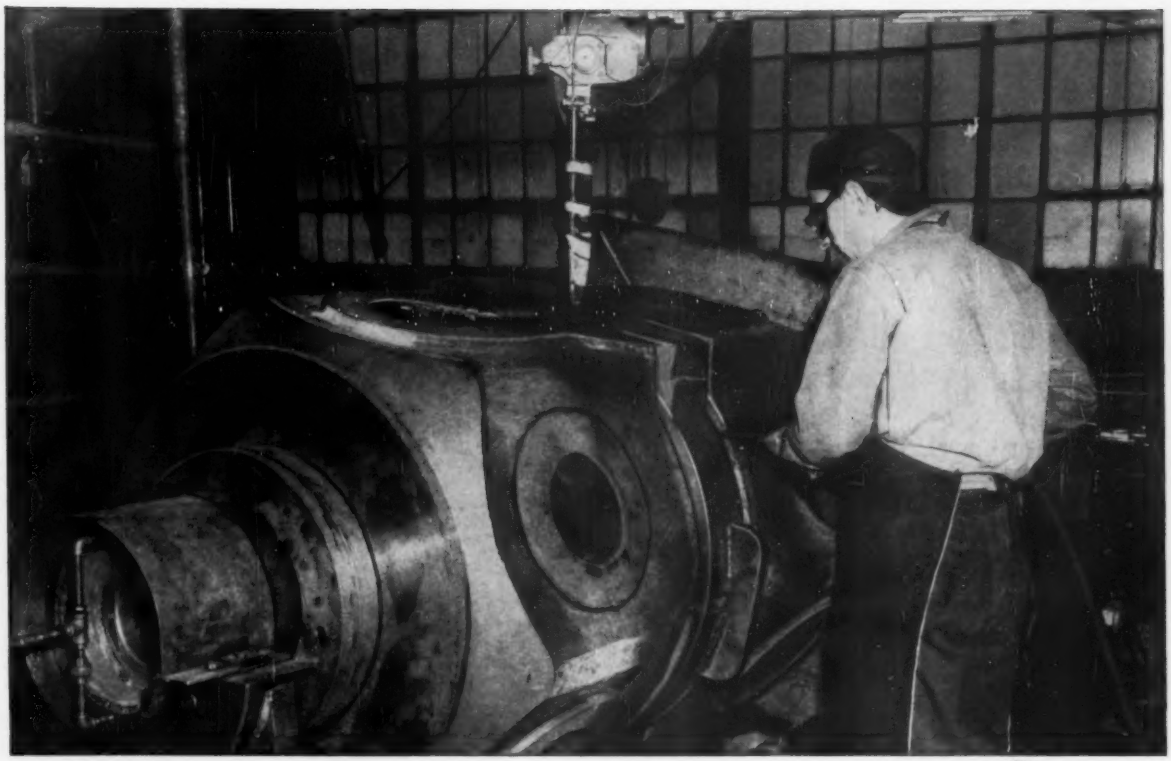
Write for Catalog

ARMSTRONG-BLUM MFG. CO.

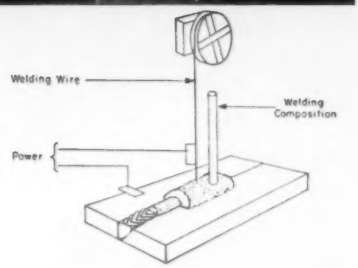
5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

MARVEL *Metal Cutting* SAWS

Better Machines—Better Blades



UNIONMELT Welding Solves "Impossible" Casting Job . . .



UNIONMELT welding solved the problem when a manufacturer was unable to make one-piece castings of compressor cylinders used in gas line pumping stations—other welding methods proved too slow and costly . . . UNIONMELT welding cuts 40 hours in production time, and produces high-quality welds that easily withstand pressure of 750 lb. per sq. inch.

The 42-in. diameter cylinder is cast in two halves, and has an internal piston bore with surrounding suction and exhaust chambers . . . The 2½-in. thick piston walls and 3-in. thick outer walls of each half are aligned and UNIONMELT welded.

Like many other products throughout industry, these cylinders are being fabricated faster and more economically than ever before, because UNIONMELT welding offers:

- Higher welding currents than other welding processes . . . Up to 4,000 amperes . . . Joins metal of any thickness.
- Greater economy—½ to ⅔ less welding wire . . . Also uses larger-diameter, less-expensive wire.
- Use of any power supply—a.c., d.c., or constant potential . . . With c.p., no control is necessary to maintain constant arc voltage—welding is fast and more easily controlled.

Start saving now—call your local LINDE representative for more information and ask for Form 7942, "Modern Methods of Joining Metals."

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
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You can now get ANY TYPE FILE YOU NEED from one complete line — SIMONDS! The famous "RED TANG" Line now includes ALL TYPES OF FILES for every purpose: machine shop, saw filing, die making, precision craftsmen, automotive, aircraft, pattern makers, foundries, railroad and shipyards, garages and for special applications.

All are Grade A only . . . backed by SIMONDS reputation for outstanding quality, dependability and service. Call your Simonds Distributor now for ALL your file needs. Ask for "Red Tang" . . . and be sure of the best!

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Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

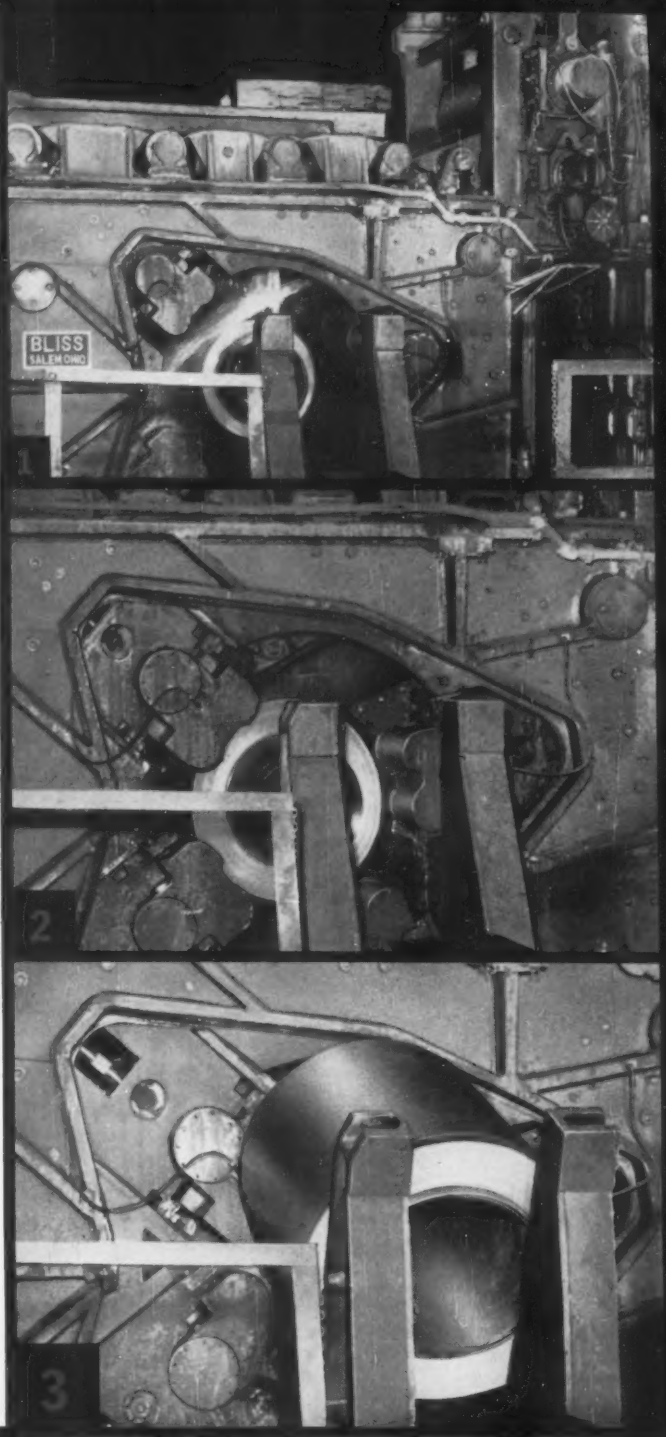
At Youngstown's Indiana Harbor Works...

A NEW BLISS DOWNCOILER FOR BOOMING HOT STRIP MILL

A recently-installed Bliss downcoiler is helping the hot strip department at Youngstown Sheet & Tube's Indiana Harbor Works reduce the strain of maintaining record output levels that have hovered at or near capacity for months. The new Bliss unit increases downcoiler capacity 50%, lightens the load on two older downcoilers.

This is the latest in a series of downcoiler installations in American and foreign steel plants dating from Bliss' development of the expanding mandrel design. The advantage of the expanding mandrel is that the strip end is held firmly during coiling. Thus, the coil is tight, solid and smooth-edged. When coiling has been completed, the mandrel collapses, freeing the coil for easy ejection onto the upender. Surface damage is eliminated: blocker roll controls permit the operator to pull the rolls back from the coil as soon as the mandrel picks up the snubbed end of the strip. The rolls do not touch the strip again until the trailing end is about to be taken up, thus supplying a tightly wrapped coil throughout.

Bliss hot mill downcoilers can be built for any practical strip width and gage, coil weight and run-out speed. If you would like more information about them ...and about other important Bliss rolling mill developments...write for a free copy of our 60-page Rolling Mill Brochure, Catalog 40-A.



Tight coils without surface damage!

1. Red hot 54" strip traveling 1700 fpm is taken up on mandrel of new Bliss downcoiler at Indiana Harbor Works. Note that blocker rolls are retracted, leaving plenty of clearance. Expanded mandrel grips I.D. of coil firmly, maintaining tension on the strip.

2. Blocker rolls move in as trailing end of strip comes through pinch rolls (upper right), at end of run-out table.

3. Eight-thousand-pound coil is easily stripped from the collapsed mandrel segments. Note smooth edges and tight winding. Upender is beginning to transfer coil to conveyor station, where it will be banded and marked with heat number.

E. W. BLISS COMPANY, General Office: Canton, Ohio
ROLLING MILL DIVISION, SALEM, OHIO

BLISS
SINCE 1857

Bliss is more than a name... it's a guarantee

Presses, ROLLING MILLS, Special Machinery

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California
E. W. Bliss (England) Ltd., Derby — E. W. Bliss Co. (Paris), France

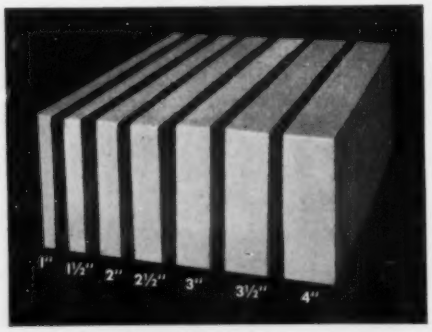
Specify J-M Superex, industry's favorite block insulation

Made from diatomaceous silica and asbestos for all temperatures to 1900F

YOU'LL ENJOY *greater insulation savings* with Superex®. Its unique combination of low conductivity and outstanding resistance to high temperatures provides greater operating efficiency and longer maintenance-free service. That's why Superex is the leading block insulation for furnace work.

Light and easy to work. Superex withstands temperatures to 1900F indefinitely with negligible loss of efficiency and is so strong that it compresses only ⅛ inch under 6 tons' pressure per square foot. Its light weight, excellent working properties and availability in large blocks mean quick, easy, low-cost installation.

For high temperature equipment. Since its introduction in 1927, Superex has received enthusiastic acceptance. Today it economically insulates 90% of the country's hot blast stoves. Other high temperature equipment where Superex has proved its superior performance include most types of industrial and metallurgical furnaces and ovens, stationary and marine boilers, regenerators, kilns, roasters, high-temperature mains, flues and stacks.



Saves waste—Superex comes in 7 standard thicknesses from 1" to 4". Other sizes available on order.

For further information on Superex, write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.

JM PRODUCTS

Johns-Manville *first-in* INSULATION

MATERIALS · ENGINEERING · APPLICATION

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

S.S. United States... most modern, fastest liner afloat.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

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ELMIRA, N.Y.

High Speed Precision
MILLING MACHINES

The RIGHT Size For Work
Too Small for Heavy Duty Millers.

Advantages

- Saves Production Time
- Higher Speeds
- Lower Power Consumption
- Less Investment
- Saves Floor Space

1 1/16" Cutter Spindle Capacity
with 5C Round Hardinge Collet
Eight Spindle Speeds —
110 to 1850 R.P.M.

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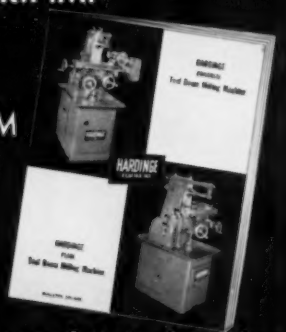
Bulletin TM-UM

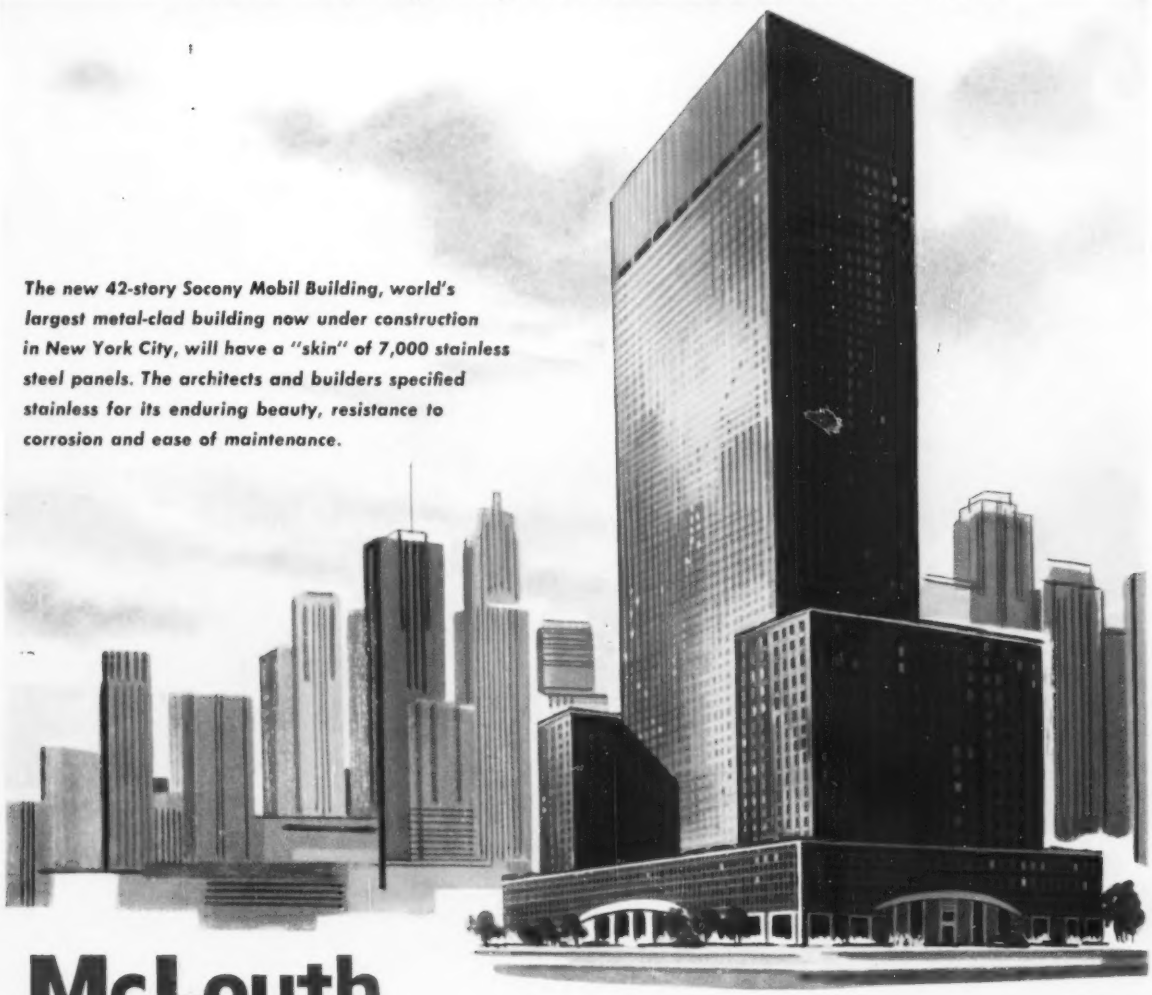


Model UM Universal Spiral Miller
Model TM Universal Plain Miller

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

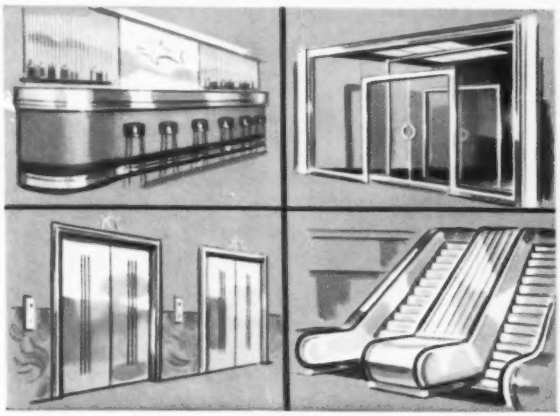
OFFICES IN PRINCIPAL CITIES. Export Office: 269 Lafayette St., New York 12, N. Y.

modern design specifies stainless steel



The new 42-story Socony Mobil Building, world's largest metal-clad building now under construction in New York City, will have a "skin" of 7,000 stainless steel panels. The architects and builders specified stainless for its enduring beauty, resistance to corrosion and ease of maintenance.

McLouth
STAINLESS
Steel
for buildings

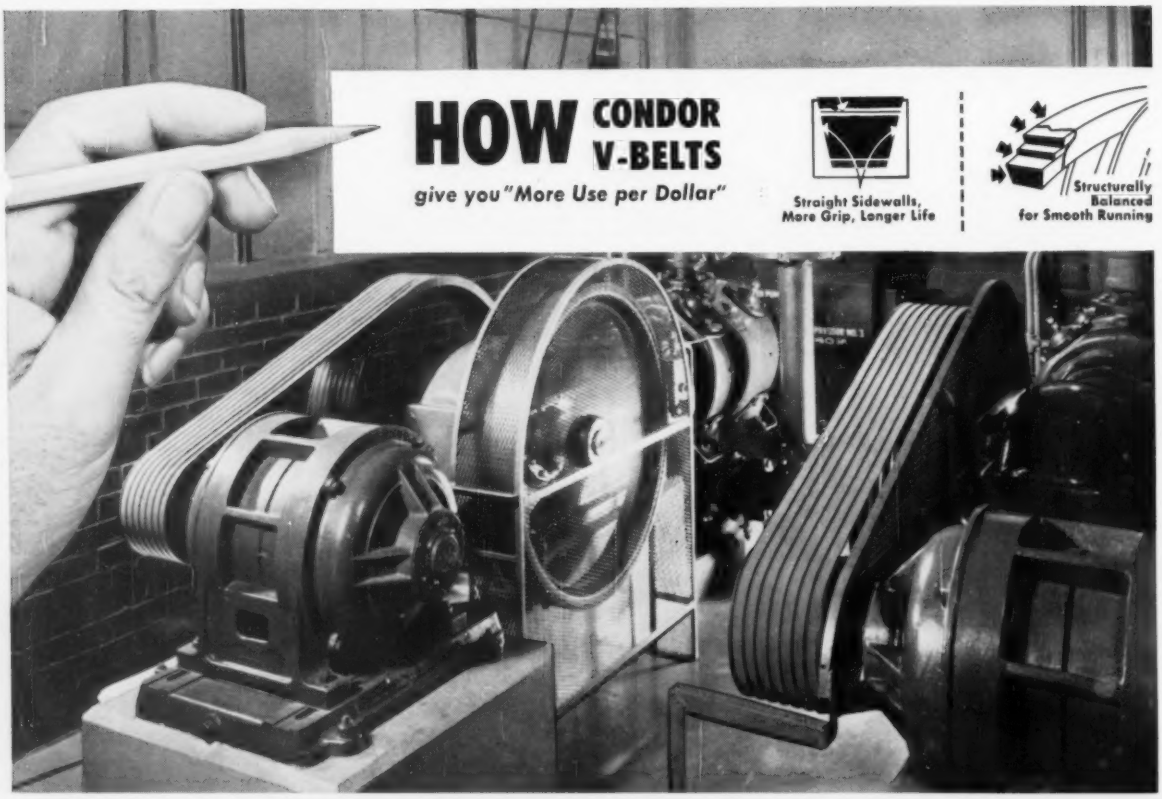


In fixtures, trim, curtain walls and hundreds of other applications you will profit by using McLouth Stainless Steel.

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel.

McLouth Steel Corporation
Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS



HOW CONDOR V-BELTS

give you "More Use per Dollar"

Straight Sidewalls, More Grip, Longer Life

Structurally Balanced for Smooth Running

These Smoother Running V-Belts Lower Your Operating Costs

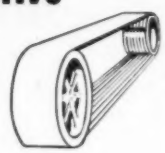
Condor V-Belt engineering makes the difference. The strength member is micro-positioned in heat dissipating rubber for a smoother running, cooler running drive . . . for longer life with the heaviest power loads. Condor V-Belt sidewalls are made *straight* to put positive pressure on the sheave grooves for more grip . . . less slip. Straight sidewalls help support the super-strength synthetic cords of the belt in a straight line so that *all* cords pull equally . . . deliver their maximum share of power. Controlled length is accomplished through prestretching during manufacture to remove inelastic stretch that might otherwise occur on the job.

NOW . . . Moisture-Proof Vacuum Packaging

R/M's exclusive new vacuum sealed moisture-proof packaging assures positive V-belt length control for users of longer lengths in C, D & E cross sections! Belts are measured at the factory under controlled humidity and identified for precise matching. They are then vacuum-sealed in moisture-proof aluminum lined bags. The result—no shrinkage or elongation in storage . . . sustained uniformity on the drive! Length is certified from the factory to the field.

R/M Poly-V* Drive

A New Belt Drive Concept For Heavy-Duty Power Transmission. Eliminates V-belt matching problems. Delivers up to 50% more power in the same space as regular V-belts or equal power in less space.



Write for copy of Poly-V Drive Bulletin #6638.

(*Poly-V is a registered Raybestos-Manhattan trademark)

R/M

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Flat Belts

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Conveyor Belt

Hose

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Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

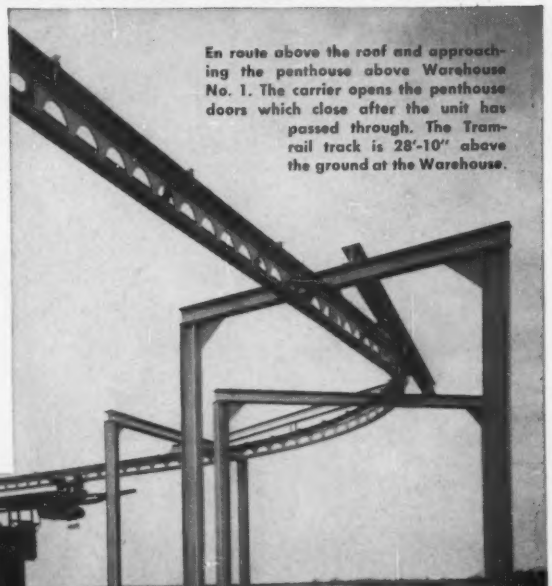
Uses Roof To Link Distant Departments

Automatic Tramrail System Saves "240 Man-Hours" Per Week

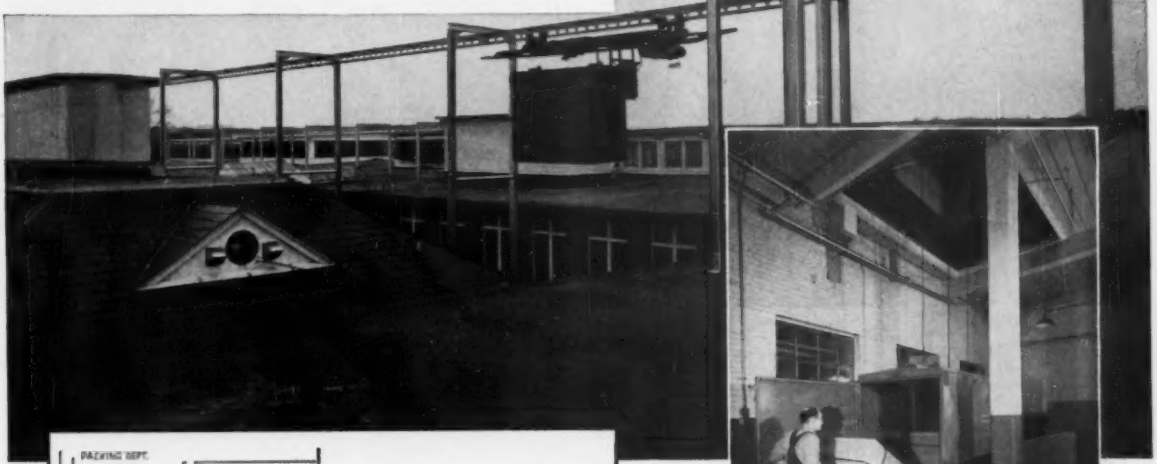
By installing a Cleveland Tramrail automatic dispatch system that extends partly over roof tops and partly between buildings, the North Carolina Finishing Co., Salisbury, N. C., was able to successfully link two widely separated departments and secure the same advantages that would be obtained if they were adjacent to each other.

This system has been in operation since 1949. It is an excellent example of the application of a bit of imagination to overcome an awkward and costly materials handling situation. It reduces the time for movement of packaged rayon cloth from the Packing Department to the No. 1 Warehouse by 240 man-hours per week.

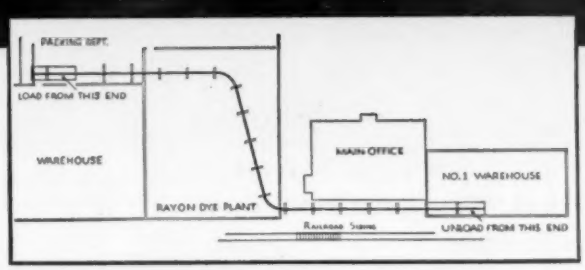
A wide variety of Cleveland Tramrail automatic dispatch systems is now serving industry. For real savings we suggest that you get the facts on this modern method of handling materials.



En route above the roof and approaching the penthouse above Warehouse No. 1. The carrier opens the penthouse doors which close after the unit has passed through. The Tramrail track is 28'-10" above the ground at the Warehouse.



6 to 8 cartons weighing 100 to 400 lbs. each are loaded into the Tramrail freight van. The button on wall, at left, sends the van on its way, first upward through ceiling opening, and then forward on outside roof track. The van measures 4'-0" x 8'-0" x 6'-6" high.



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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4805 East 290th St., Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

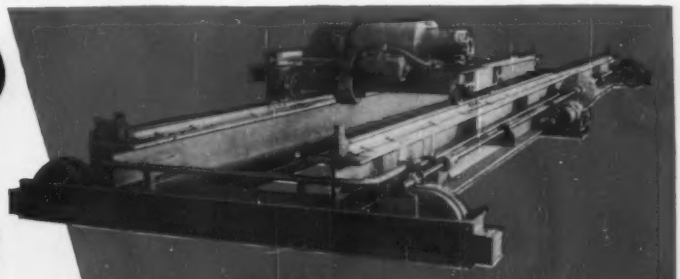
This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

EUCLID
MATERIAL HANDLING EQUIPMENT
Since 1910



Typical double girder general purpose crane composed of standard components. A wide variety of spans and capacities available with floor, cab or remote controls. Modified as desired to meet special requirements.

Euclid Cranes and Hoists are produced by specialists to render efficient service with minimum attention.

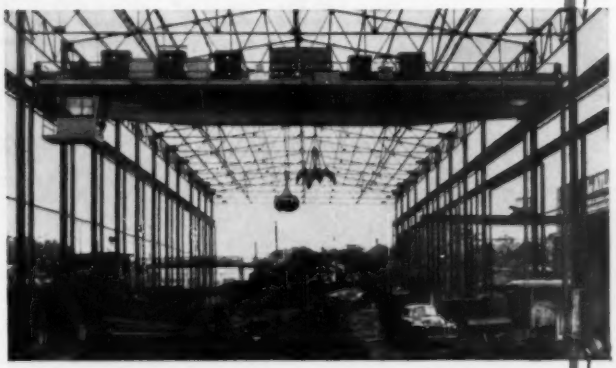
Their high quality is evidenced by a long list of discriminating purchasers and an impressive record of repeat orders.

Euclid Cranes are available in a large range of sizes and capacities. They include top running, underhung, single or double girder, motor driven or hand power, for all types of industry and service.

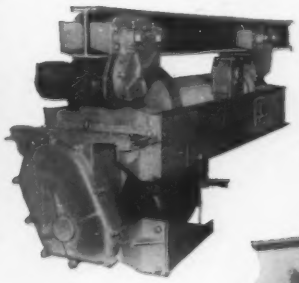
Trolleys are built with one or more hoists as required with any type of control. Top running, underhung, submerged or full revolving trolleys are available.

Special cranes are built to customers' specifications or to plans developed by our engineers.

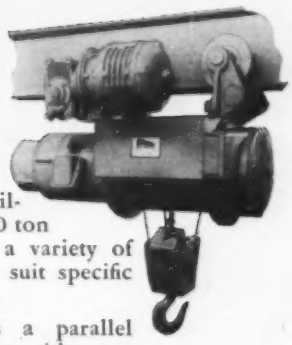
Typical machine tool assembly cranes. Crane in foreground utilized for sub-assemblies. High capacity two hoist crane in background handles small assemblies as well as the completed machines.



Long span heavy-duty, scrap yard crane with magnet and grapple designed to steel mill specifications.

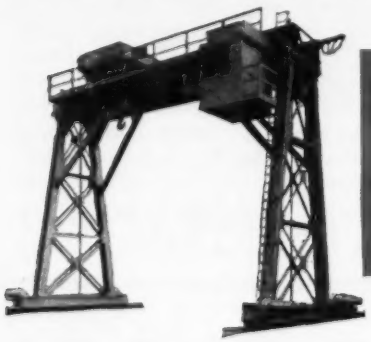


High lift heavy-duty monorail hoist, designed for either motor driven or hand power trolleys, may be provided with cab or floor control in capacities up to 30 tons.



Series HB hoists are available in 3 to 10 ton capacities in a variety of mountings to suit specific requirements.

Illustrated is a parallel mounted hoist with cone gear trolley drive.



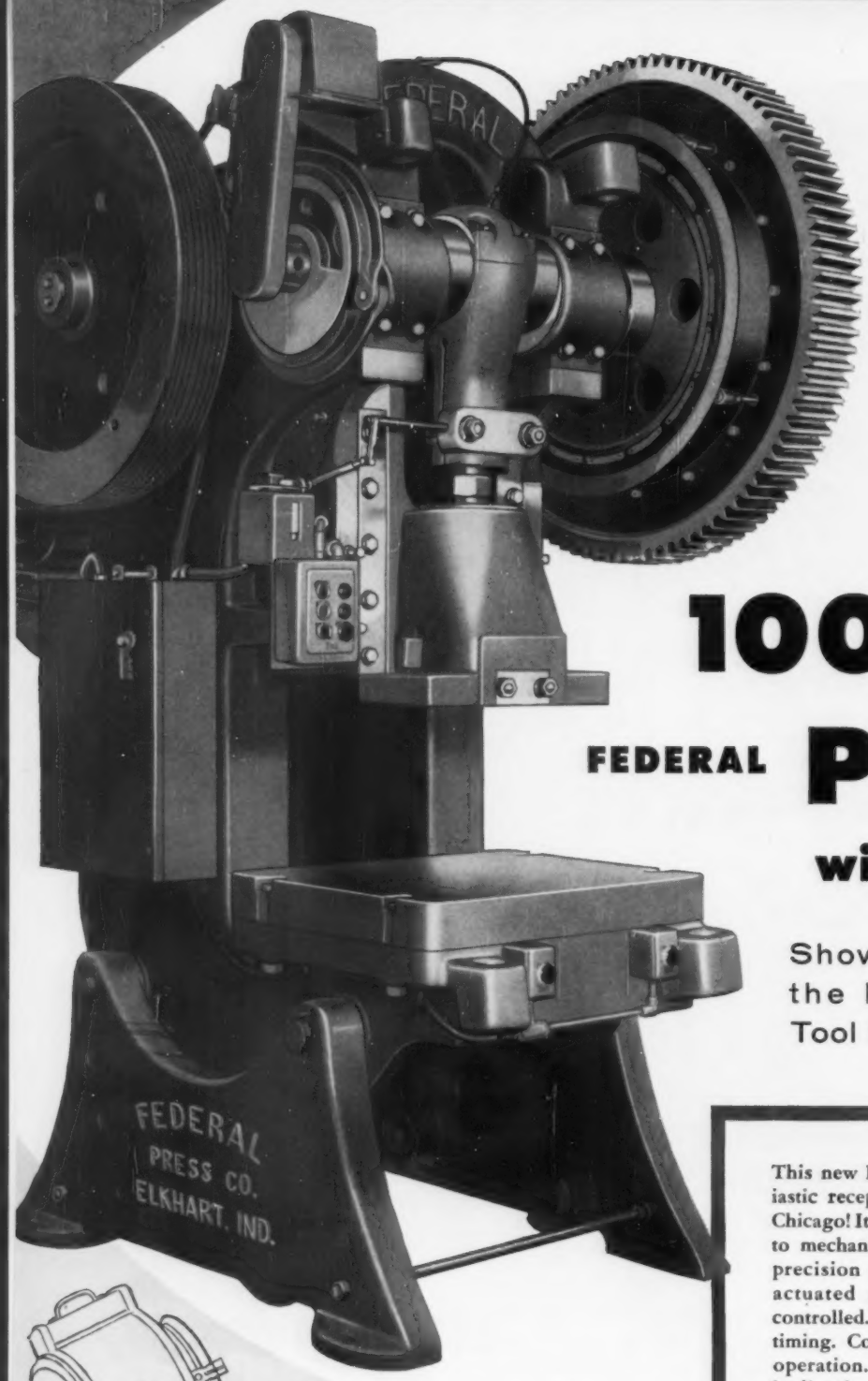
Heavy-duty gantry crane with four bridge motors. Designed for rugged continuous service.

Write for the Euclid Crane Catalog

stating the type and size of crane or hoist in which you may possibly be interested

The EUCLID CRANE & HOIST CO.

1361 Chardon Road • Cleveland 17, Ohio



Here's the great new

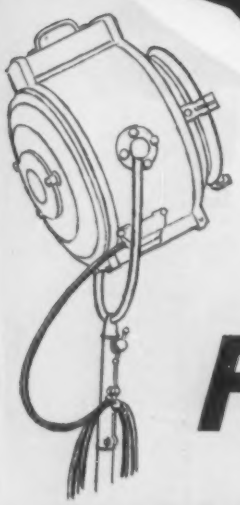
100-TON FEDERAL PRESS

with air clutch

Shown for first time at the National Machine Tool Show in Sept., 1955

This new Federal Press enjoyed an enthusiastic reception at its premier showing in Chicago! Its many outstanding features bring to mechanical presses a new standard of precision and safety at high speed. Air-actuated clutch. Electro-pneumatically controlled. Dual-solenoid safety valve. Inch-timing. Continuous as well as single-cycle operation. This new Federal Press embodies the same high quality materials and workmanship that have distinguished Federal construction for more than 30 years.

FEDERAL PRESS COMPANY
602 Division Street, Elkhart, Indiana



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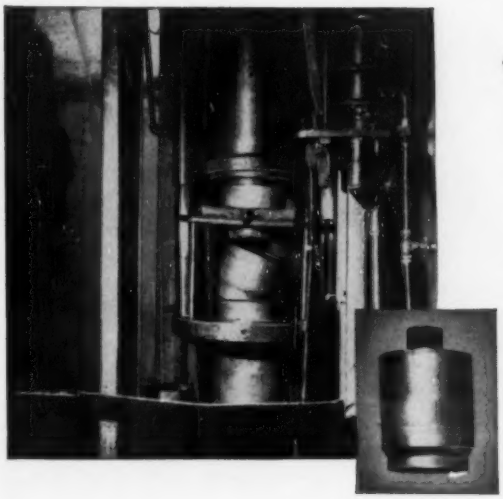
FEDERAL *Open-back Inclinable* PRESSES

30 Years of Quality Construction

Look How You Save by Hard-Facing

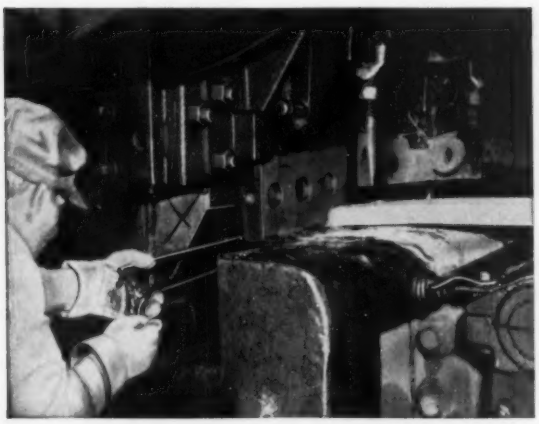


PRODUCTION LIFE INCREASED 1000%

This hard-faced punch mandrel has produced 10,000 pipe couplings and still shows no sign of losing gage. Unprotected tool steel mandrels wore out after punching only 1000 pieces, and case-hardened mandrels punched only 500 pieces before they had to be replaced. A 3/16-in. layer of HAYNES STELLITE hard-facing alloy protects the mandrel from wear and galling.

SAVES $4000 PLUS

Rebuilding this worn extrusion screw with HAYNES STELLITE alloy No. 1 cost $2000—$4000 less than a new screw would cost. And the rebuilt screw will give from 4 to 6 times more service than a new, unfaced screw. The screw is used to extrude rubber from a solid to a semi-liquid state. Wear is the chief problem, and it is effectively resisted by the hard-faced surfaces.



SHEAR 4 TIMES THE TONNAGE

These hard-faced blades shear an average of 200 tons of tough alloy billets. This is more than 4 times the average for special steel blades. Hard-facing with HASTELLOY alloy C protects the blades from wear, and they keep a keener cutting edge longer. When the blades finally do wear, they can be hard-faced again at a fraction of their replacement cost.

FREE —

Write for the 40-page "HAYNES Hard-Facing Manual."

HAYNES *alloys*

Trade-Mark

Hard-facing products made from cobalt-base alloys, nickel-base alloys, and tungsten carbide in the form of rod, wire, and coils.

"Haynes," "Haynes Stellite," "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
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General Offices and Works, Kokomo, Indiana
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Engineering and Production Men...
Save 3 ways with Reliance Snap Rings

By milling a groove and inserting a Reliance Snap Ring, engineers and production men have found the economical answer to forming shoulders on shafts or in counterbores. The savings in production TIME can be graphically pictured by comparing the work involved in machining inch after inch of solid metal in contrast to just cutting a groove a fraction of an inch wide. MATERIAL is saved instead of being wasted on the plant floor. In fact, less material is required at the start because standard sized shafts can be used. This all adds up to saving MONEY through efficient production.

If you would like the complete story on how Reliance Snap Rings can help your operation, write for Engineering Bulletin 4/K3. No obligation, of course.

EATON

RELIANCE DIVISION
MANUFACTURING COMPANY
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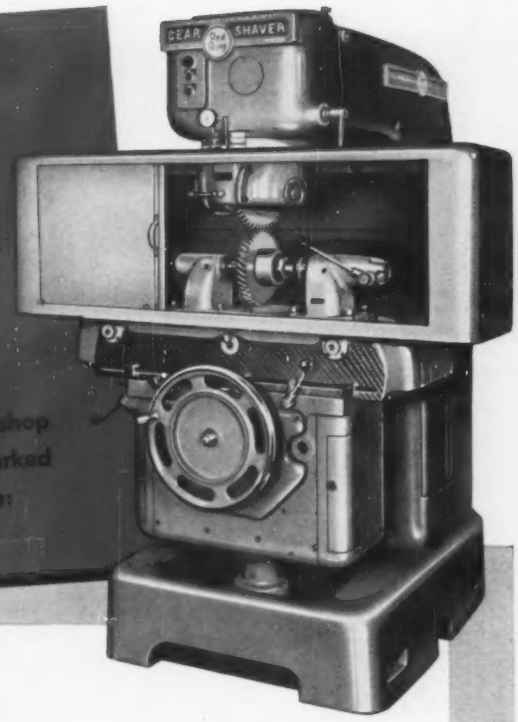
SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

The RED RING ALL-PURPOSE GEAR SHAVING MACHINE

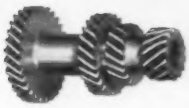
The Red Ring Model GCI is the ideal job shop gear shaving machine because of its marked versatility. With this machine you can shave:



SPUR AND HELICAL GEARS TO 18" PD

INTERNALS TO 18" PD

CAMSHAFT GEARS



CLUSTER GEARS

WIDE FACE GEARS

GEARS WITH LONG SHAFTS

LONG INVOLUTE SPLINES

STRAIGHT AND CROWNED TEETH

For high production work the GCI may be equipped with the Red Ring Automatic Differential Up and Down Feed, the Automatic Splash Guard Door and the Air Operated Tailstock to provide semi-automatic operation.

Bulletin 549-4 gives complete information and specifications. Write for it today.

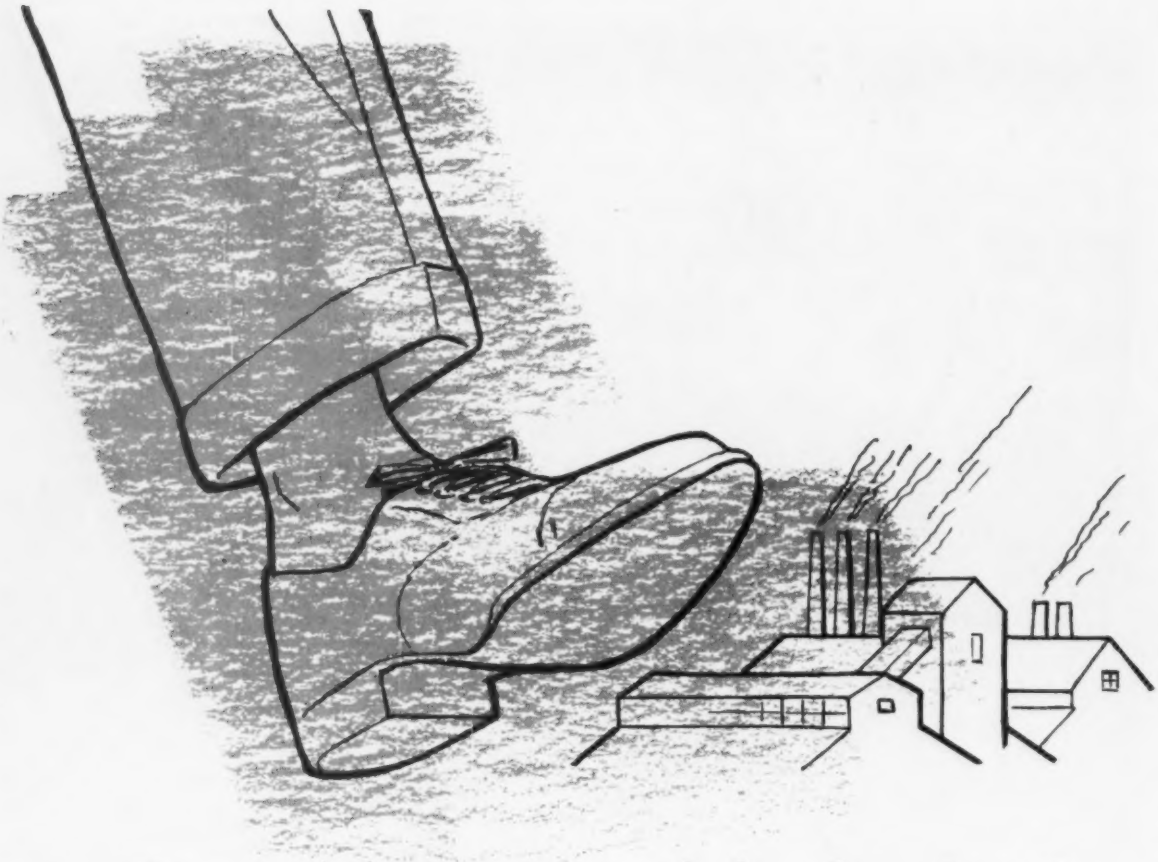
SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORM

7282

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



a step ahead...*of the changing time*

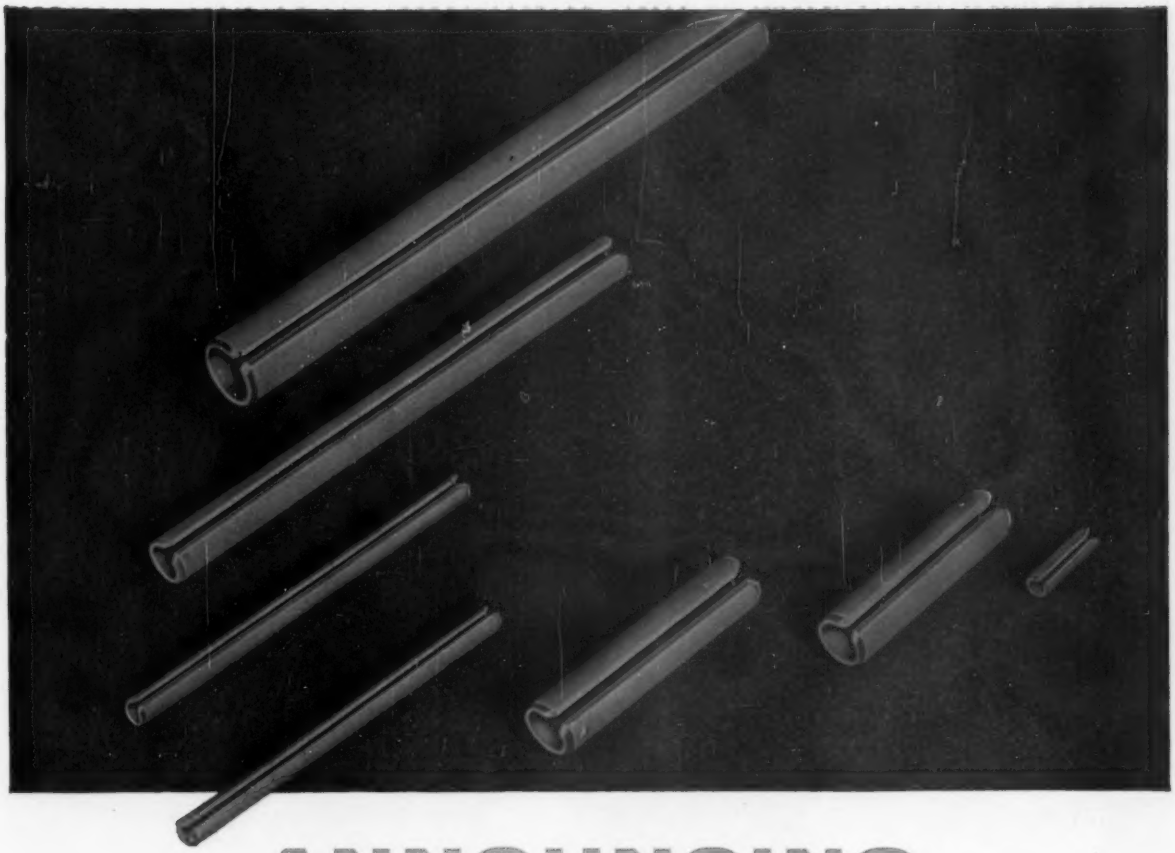
is facilitated by the production of high-grade ores, the maintenance of a fine ore vessel transportation fleet, modern mining equipment, and the employment of skilled employees. This "team work" keeps industry and commerce ahead of the times, thus insuring further development on a greater scale than ever before in history.

CCC

IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO



ANNOUNCING...

the Beryllium Copper ROLLPIN®

Strong . . . highly resistant to corrosion . . . nonmagnetic . . . extremely conductive

Now you can use Rollpin to cut assembly and maintenance costs in a whole new group of applications. A new line made of beryllium copper, one of the strongest of the copper base alloys, opens the door to a wide variety of uses where resistance to corrosive attack, good electrical properties and other unusual characteristics are required. These slotted tubular copper spring-pins can be used in assemblies that range from plumbing fixtures to electrical instruments, particularly in conjunction with other copper base alloy components.

Rollpin has already established its ability to replace taper pins, straight pins and set screws; to serve as a rivet, dowel, hinge pin, cotter pin or stop pin . . . eliminating special machining, tapping and the need for hole reaming or precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can be readily drifted out and reused whenever necessary.

Rollpin is available in beryllium copper from .062″-diameter to .250″-diameter, and in steel and stainless steel up to .500″-diameter.

ELASTIC STOP NUT ESNA **CORPORATION OF AMERICA**

Dept. R35-177, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Data on beryllium copper Rollpin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

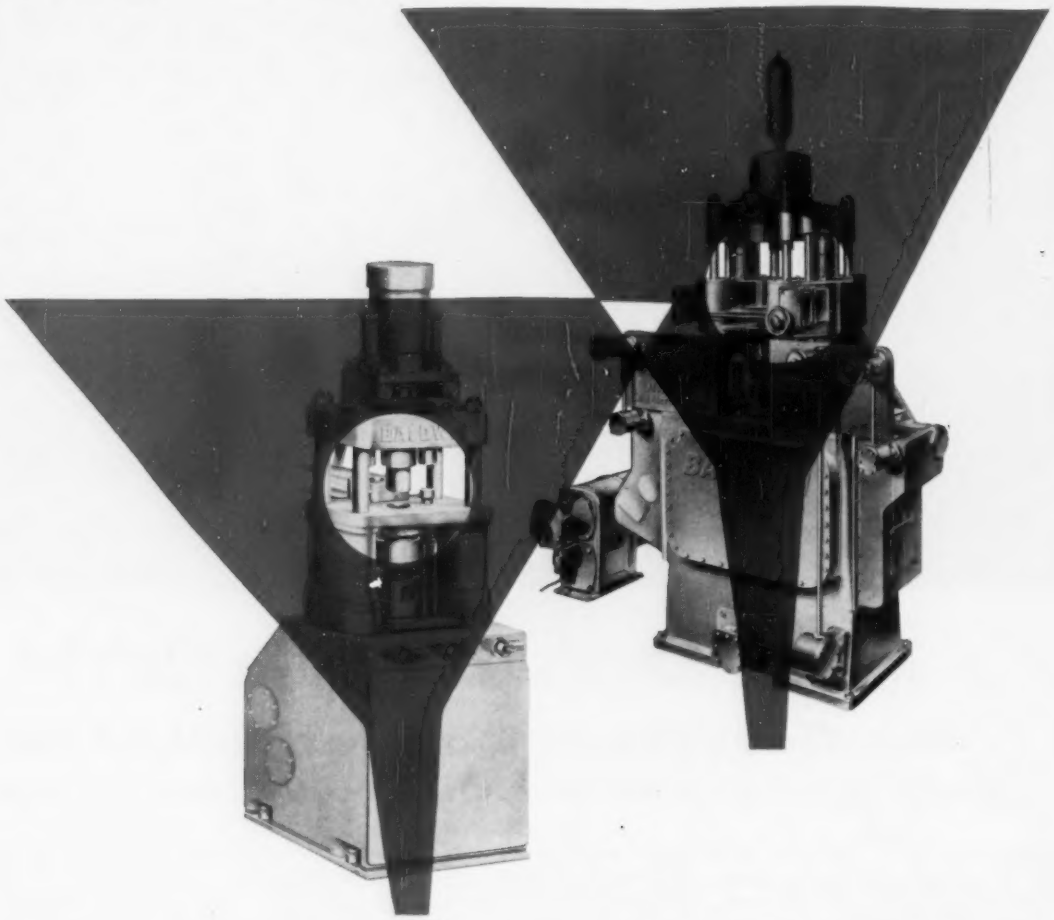
Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

PRECISE FILLING OF DIES *by new Baldwin powdered metal presses makes compacts more uniform . . .*



THEIR highly efficient shuttle type feeders enable Baldwin's new Model "L" and Model "C" powdered metal presses to compact parts much more uniformly. Air operated and cam controlled, this unique feeder moves from under a stationary hopper to a position over the die. It carries the same volume of material over the die cavity each time with a very smooth motion.

This shuttle is supported on guide rods with a spring loaded cutoff ring which prevents loss of material. Cleanline design of the feeder eliminates those recesses or projections that might keep the powder from filling the die cavity completely.

This is just one of the ways you'll benefit by specifying Baldwin Model "L" (50-ton) or Model "C" (100-ton) presses to meet the growing demand for powdered metal parts. These new presses are the very first designed specifically for use in compacting metal powders. Both feature sealed mechanisms, hydraulic heads, special fill adjustments, automatic lubrication and variable cycling.

For our new bulletins on "L" and "C" please write promptly to our Dept. 4769, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

BALDWIN BLH LIMA-HAMILTON

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Philadelphia 42, Pa. • Offices in Principal Cities

THE RED CIRCLE *is your Guarantee!*

RED CIRCLE Rolls ALLOY-CHILLED

For over fifty years Hyde Park Red Circle Rolls have been giving top production and achieving new endurance records in many mills throughout the country.

A Red Circle Roll for every purpose.

Chilled Rolls • Alloy Iron Rolls • Moly Rolls • Nickel Chilled Rolls • Grain Rolls • Cold Rolls • Sand Rolls
Chilled Hydraulic Rams

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Hyde Park Rolling Mill Equipment is extra rugged to withstand the increasing demands of production.

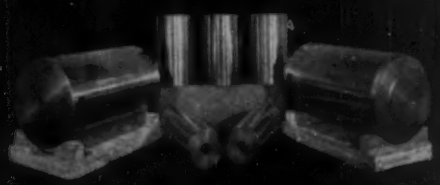
Bar Mills • Merchant Mills • Sheet and Strip Mills • Pinion Stands • Roller Tables • Reduction Drives • Stretcher Levellers • Guillotine Shears • Sheet Mill Shears • Roll Lathes • Special Machinery • Machine Work

Hyde Park Rams

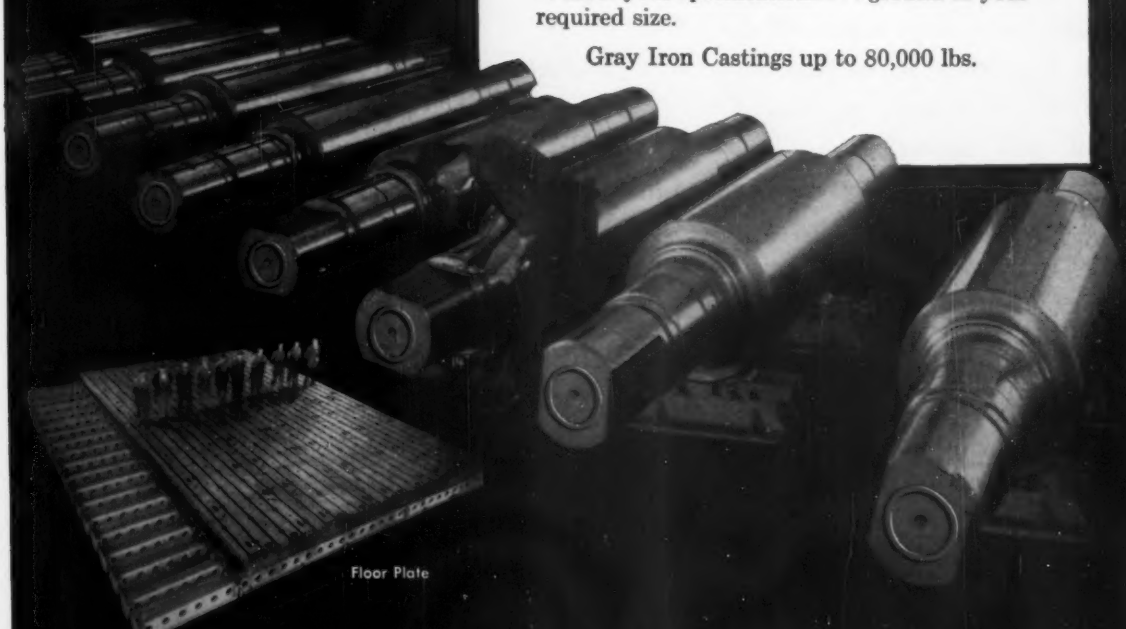
Available in Chilled or Alloy Iron, for all types of hydraulic equipment . . . in hardness range to meet your specifications . . . ground to your required size.

Gray Iron Castings up to 80,000 lbs.

18" 3 Hi Bar Mill



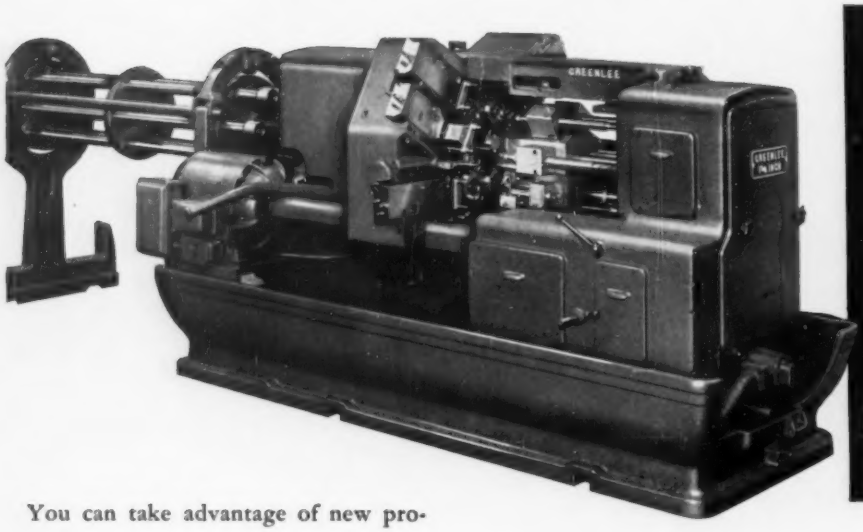
Chilled Iron Hydraulic Rams



Floor Plate

Hyde Park FOUNDRY & MACHINE CO.
HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.

now... greater accuracy, faster production



WITH GREENLEE SIX-SPINDLE AUTOMATICS

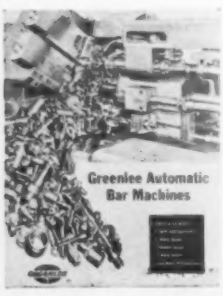
You can take advantage of new production techniques...attain higher levels of efficiency with the improved Greenlee 6-Spindle Bar Automatic. Its advanced design opens the door to some real profit opportunities. • These design improvements are fully described in a catalog recently issued. Let us send you a copy today. Find out how Greenlee Automatics can save time and money in your plant. It will pay you to investigate.

IMPROVED SPINDLE CONSTRUCTION

The spindle has been completely redesigned to assure greater accuracy at higher speeds. True running... the new Greenlee spindle has five widely spaced, preloaded, angular-contact, precision ball bearings. Entire spindle is dynamically balanced for smooth operation. Metallic seals, labyrinth and friction washers with line contact provide maximum heat dissipation.

INCREASED SPEED

Spindle speed range has been increased. Enables you to take full advantage of the top efficiency and peak performance which carbide and high-speed tooling offer. Reduces down-time losses and tool costs.



WRITE FOR CATALOG No. A405

PRODUCTION MACHINERY
GREENLEE

GREENLEE BROS. & CO.
1801 Mason Avenue
Rockford, Illinois

ARMSTRONG

Quality TOOLS

More than meets the eye

There are extra values in ARMSTRONG TOOLS that become apparent only with use.

TOOL SENSE— convenience in use — the most efficient *"tool approach"* built into ARMSTRONG Tool Holders; the balance and *"feel"* of an ARMSTRONG Wrench; the *rigidity* of ARMSTRONG "C" Clamps; the extra *toughness* of ARMSTRONG Lathe Dogs and Eye Bolts; the universal *adaptability* of ARMSTRONG Set-up and Hold-down Tools — the evidence of "tool sense", the understanding of each tool's requirements.

STRENGTH — built into each individual ARMSTRONG TOOL is a safety factor of extra *strength* — *strength* beyond any need, the inherent strength of specially selected materials enhanced by proper heat treatment and hardening.

UNIFORM QUALITY — the uniform quality made possible by modern manufacturing methods, in a specially-built plant equipped with every needed quality control. The name ARMSTRONG with the Arm-and-Hammer Trade Mark is universally recognized as a guarantee of finest quality.

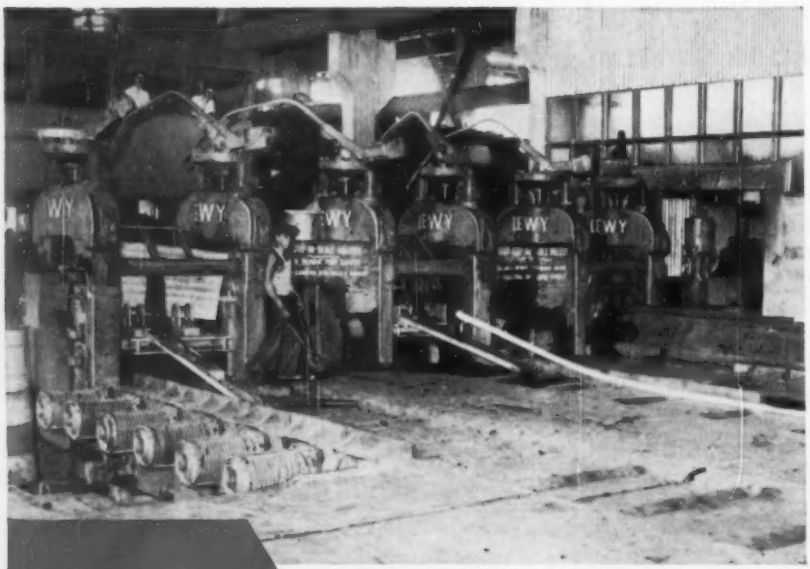
ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5209 WEST ARMSTRONG AVE. • CHICAGO 30, ILLINOIS

LOEWY ROLLING MILLS

AND ROLLING MILL EQUIPMENT FOR
STEEL, LIGHT METALS, COPPER AND BRASS



18" Roughing Mill

Continuous Billet and Sheet-Bar Mills • Continuous Merchant and Wire-Rod Mills • Continuous Strip Mills • Skelp Mills • Two-High and Three-High Blooming Mills • Hot and Cold Mills for Non-Ferrous Metals • High-Speed Cold Rolling Strip and Sheet Mills • High-Speed Foil Mills • Special Mills

Parts of a Modern Bar – and Merchant Mill Plant built for the National Shipyard and Steel Corporation, Manila, Philippines.

Complete

SERVICES FROM PLANNING TO FULL OPERATION

12" Finishing Mill with Square and Oval Repeaters

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HYDRAULIC DIVISION • ROLLING MILL DIVISION

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announcing

Industrial Brownhoist rubber-tired diesel electric cranes

electric travel, electric rotation!
25 to 60 ton capacities!

Designed and built by Industrial Brownhoist Corporation for mines, quarries, railroads, steel mills, the lumber industry and other large manufacturing plants that require mobile materials handling equipment in heavy duty capacities, Brownhoist's first Diesel Electric Wagon Crane is now in production. Available in capacities from 25 to 60 tons, the new wagon crane will be equipped with dynamatic clutch, anti-friction bearings at essential points, and power steering. It employs electric travel and electric rotation. Mounted on a 12-wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach crane and carrier controls. Rigorous tests indicate that the new machine provides economical operation and insures added savings of time and labor in heavy duty materials handling work. For complete details, consult a Brownhoist representative or write us today.

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN DISTRICT OFFICES: New York, Philadelphia, Washington, Cleveland, Chicago, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

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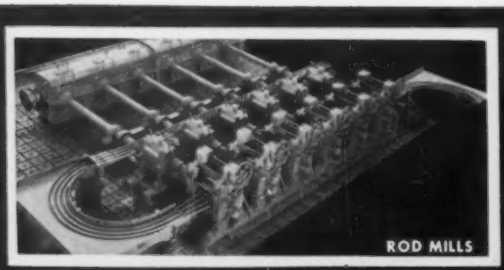
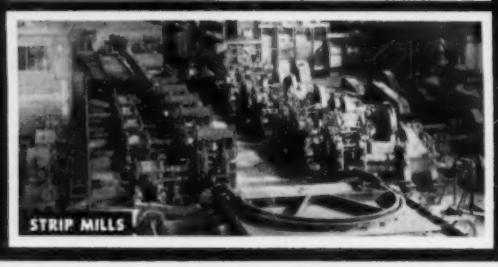
BROWNHOIST



around the world...



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is known for dependable mill equipment!

Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

• Whatever you need in mill equipment . . . wherever you need it . . . BIRDSBORO is ready to give you "customized" service, from the manufacture of a single unit to the design, building and installation of complete mills and auxiliary equipment.

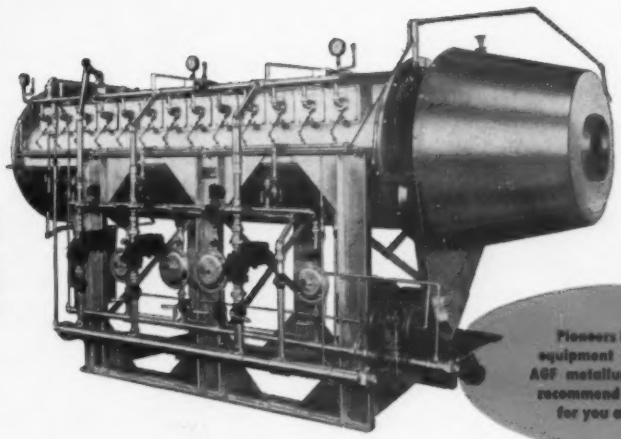
MM 43-55

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.

Controlled Atmosphere Heat Treating at the Lowest Unit Cost.

Use this continuous production furnace without modification for general and atmosphere work, including "Ni-Carb" ammonia-gas carburizing. Gentle tumbling action mixes the work and assures uniform heat treating.



Improved AGF Continuous Rotary Retort Furnaces

Pioneers in heat treating equipment for 77 years. Ask AGF metallurgical engineers to recommend proper equipment for you at no obligation.

Here are some of the many engineering improvements AGF Pioneers have made so that you can produce more pounds of work for every dollar invested in an AGF continuous rotary retort furnace. Less maintenance and operational cost than with any other furnace.

- Automatic self-metering feed hopper reduces work handling costs.
- Better control of processing atmosphere and temperature.
- Improved high production capacity combustion system.
- Increased thermal efficiency because only the work enters and leaves the furnace. Baskets, trays, chains and other troublesome mechanisms are eliminated.
- Alloy life is increased because the alloy remains within the furnace heating chamber at all times.

*Sizes in production capacities up to 800 pounds per hour. Representatives in principal cities.

AMERICAN GAS FURNACE CO.
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ELIZABETH 4, N. J.

Send me your Bulletin No. 870 which will help me produce a quality product at lowest cost.

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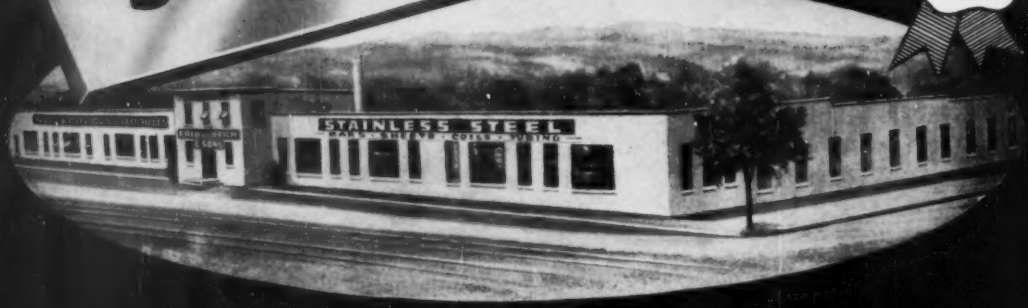
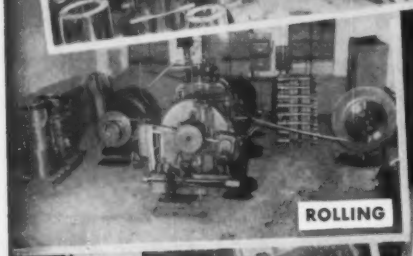
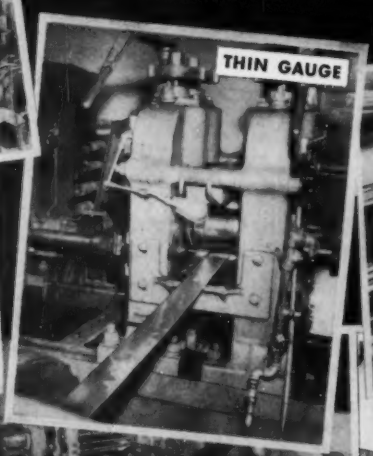
Certified ANALYSIS can be given on any Ulbrich material.

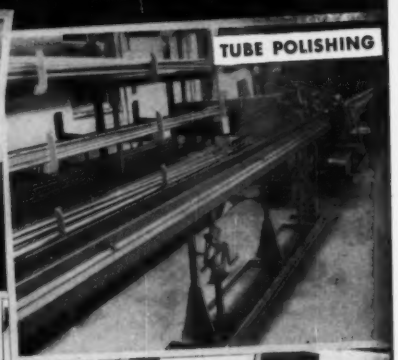


COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
Inquiries for small lots welcomed.



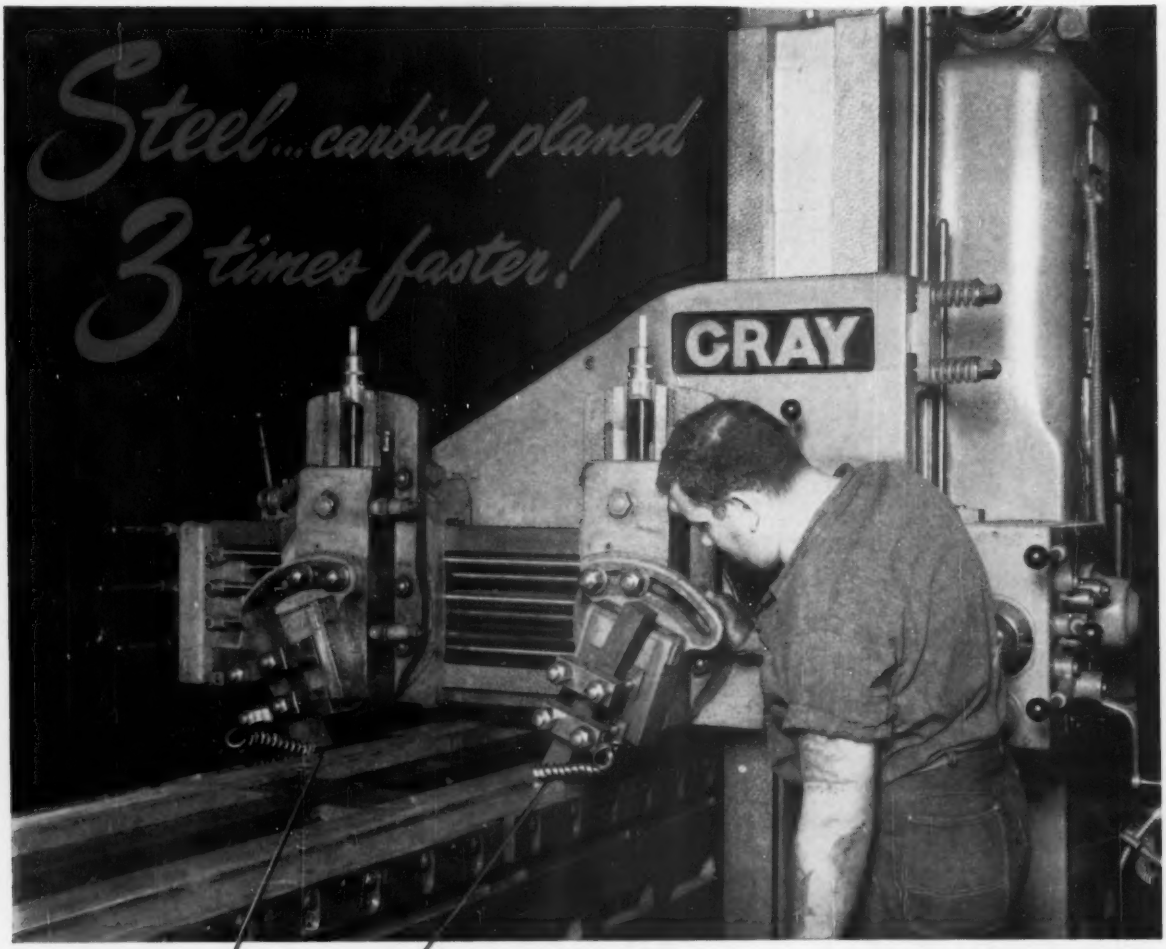




ULBRICH Stainless Steels

WALLINGFORD, CONN.

Phone: COlony 9-7771



another cost saving performance record set by the **GRAY PLANER CUB**

Former planing time of steel bars and gibs was cut to ⅓ when this high speed GRAY PLANER CUB was put into action at a leading Midwestern metal fabricating plant.

This is accomplished by the Cub's high speed, greater power and tremendous rigidity—all essential to heavy duty carbide steel planing.

Proof of outstanding performance is the fact that this company has two more Cubs on order. Built in 24" — 30" — 36" sizes. Write for Bulletin 55.

the job: planing hi-carbon, hi-chrome steel bars

cut speed 160' per min. • return speed 300' per min. • two heads • depth of cut 3/32" • feed .040

The G.A. **GRAY** *Company*

planers • milling planers
planer type milling machines
horizontal boring machines

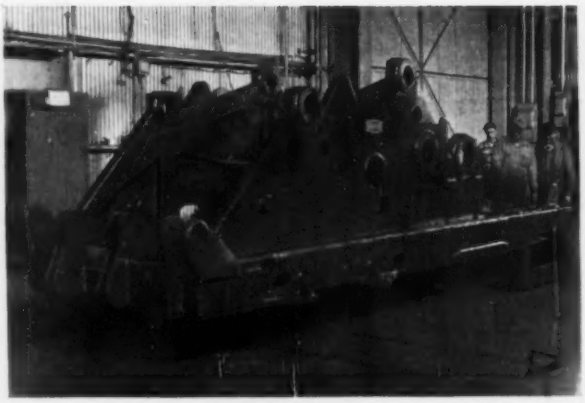
CINCINNATI 7, OHIO, U. S. A.
SOLD IN CANADA BY UPTON, BRADEEN AND JAMES, LTD. • SOLD IN LATIN AMERICA BY MACHINE AFFILIATES

GRAVER Fabricates All-Welded Revolving Frames for P&H Power Shovels

The versatile P&H Dragline pictured above, feeding rock onto a conveyor (Model 1055 LC) uses an all-welded revolving frame for extra strength. Graver recently fabricated five such assemblies for the Harnischfeger Corporation, one of which is shown in the inset.

This is an integrally welded rigid unit of box section design to withstand the great variety of stresses it will encounter. Traditional Graver quality is seen in the uniform welds which were inspected during manufacture by the most modern and comprehensive techniques. These include the initial accurate dimensional inspection on specially designed layout tables, periodic visual inspections, and magnetic particle and X-ray inspections.

Graver has achieved a reputation for developing new equipment and advanced techniques and is expert in welding carbon and stainless steels, and aluminum. For the more complex, difficult welding problems consult your Graver engineering representative. Meanwhile write for new illustrated brochure, "WELDMENTS."



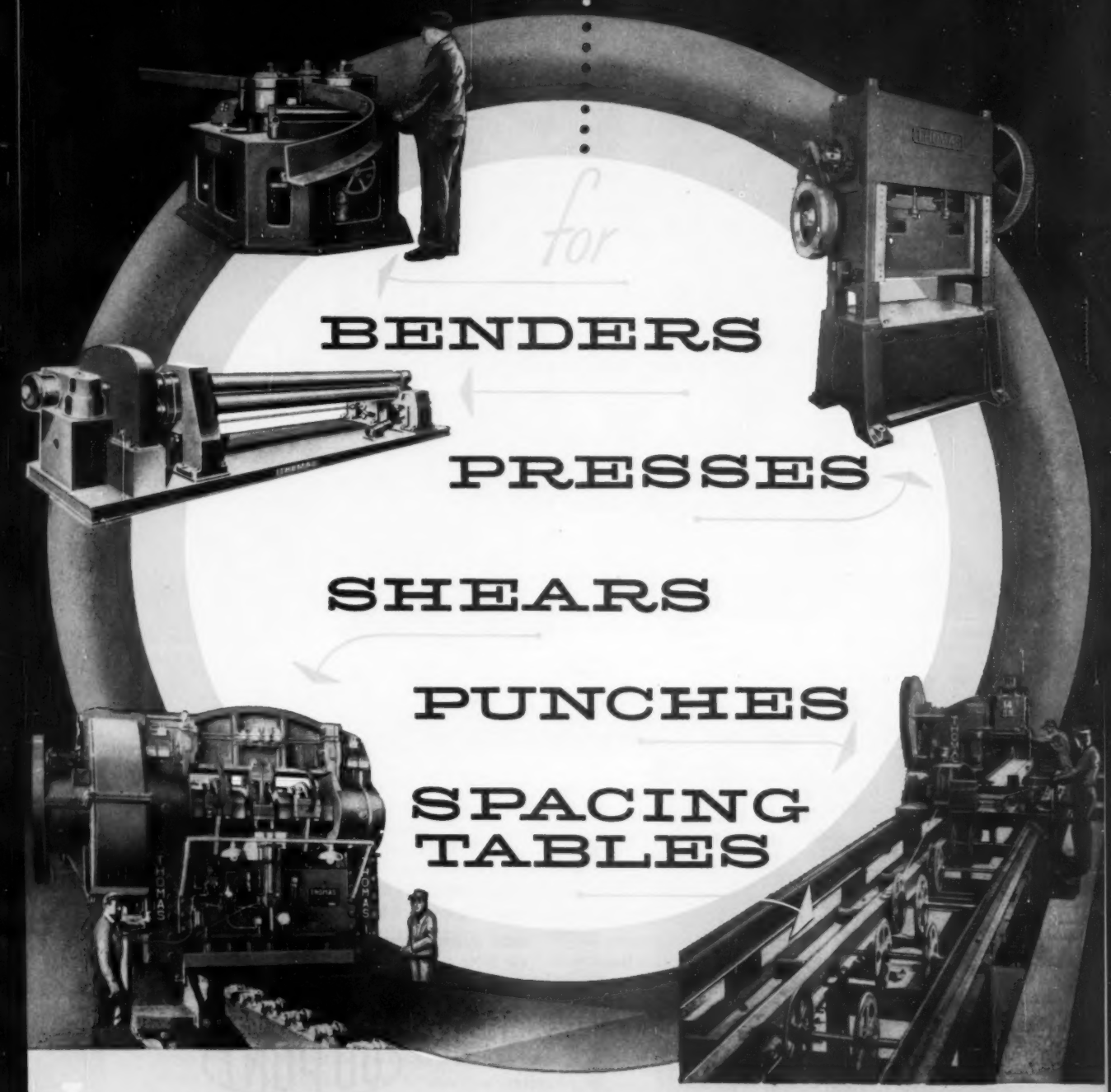
GRAVER ... *source for quality weldments*

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

CHICAGO • NEW YORK • PHILADELPHIA • EDGE MOOR, DEL. • CATASAUQUA, PA. • PITTSBURGH • CLEVELAND • DETROIT • TULSA • SAND SPRINGS, OKLA. • HOUSTON • ODESSA, TEXAS • CASPER, WYO. • LOS ANGELES FONTANA, CAL. • SAN FRANCISCO

THE TREND IS TO THOMAS



for

BENDERS

PRESSES

SHEARS

PUNCHES

SPACING TABLES

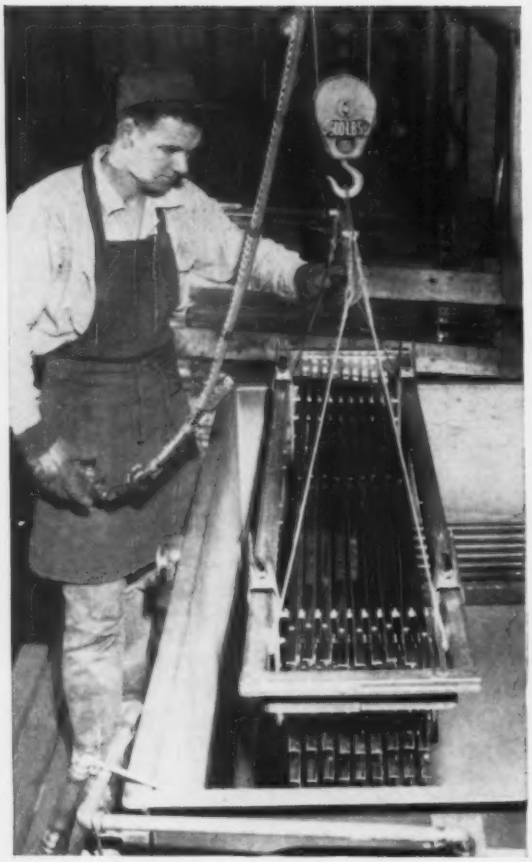
In steel mills, car shops, structural and bridge works, and general fabricating plants . . . there you will find Thomas machinery doing the job faster and better!

Every Thomas punch, spacing table, bender, shear or press is sturdily built for dependable performance, designed for production economy and available in various sizes and tonnages.

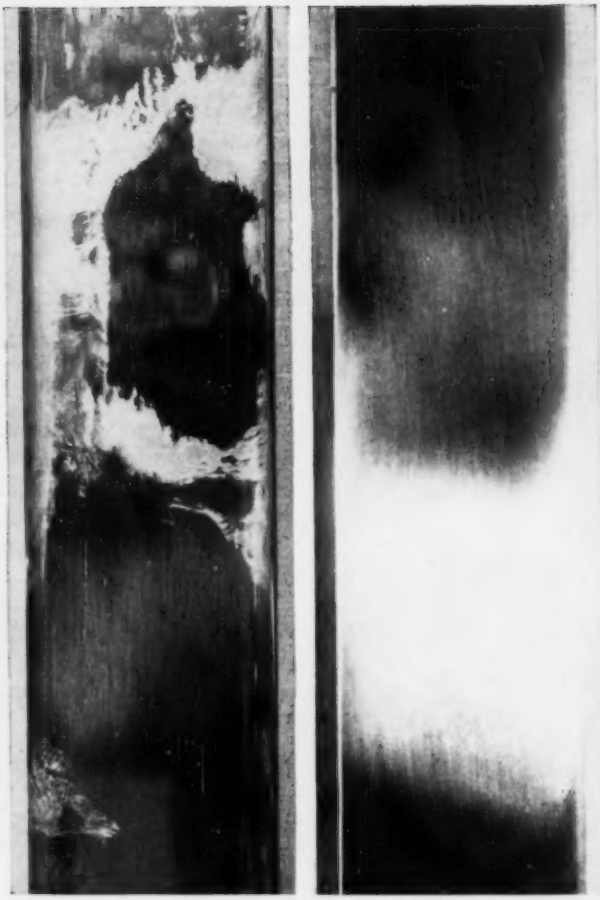
THOMAS

MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.



ALUMINUM shower enclosure parts are removed from the degreaser at Hecker Manufacturing Company, San Francisco, California. Buffing compound sludge and dirt are removed rapidly by vapors of "TRICLENE" D trichlorethylene.



CLOSEUP of aluminum parts before and after cleaning with "TRICLENE" D. Note bright, stain-free appearance of the highly polished aluminum.

"No etching of aluminum with TRICLENE® D in the degreaser"... *says Clyde Cary, Plant Superintendent,* HECKER MFG. COMPANY

"... and with 'TRICLENE' D trichlorethylene, there's no more adding stabilizers." Mr. Cary goes on to say, "What's more, we've been able to increase the time between degreaser cleanouts from every 3 or 4 days to 2 weeks."

Aluminum parts of these attractive modern tub and shower enclosures are highly polished, and when the degreasing solvent formerly used developed a high acid content—a frequent occurrence—rejects due to etching and staining mounted. Frequent degreaser cleanouts were necessary, and a close watch had to be kept over the solvent pH.

"Since changing to 'TRICLENE' D," Mr. Cary concludes, "we've noticed a big reduction in the number of rejects ... and we have no solvent control problem at all. All this adds up to real savings in maintenance and production costs."

Locked-in stabilizers give "TRICLENE" D unsurpassed resistance to all major causes of solvent deterioration—heat, light, air, acids and aluminum chloride—yet this rugged solvent contains nothing to harm even delicately machined metal surfaces. "TRICLENE" D gives brighter cleaning of any metal, distillation after distillation ... yet it costs no more!

FOR MORE INFORMATION on "TRICLENE" D and how it can bring a new standard of efficiency to your vapor-degreasing operation, write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

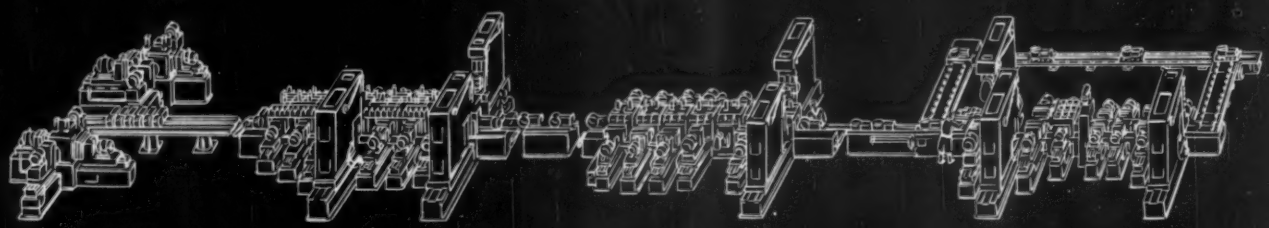
BETTER THINGS FOR BETTER LIVING ... *THROUGH CHEMISTRY*

TRICLENE® D

TRICHLORETHYLENE

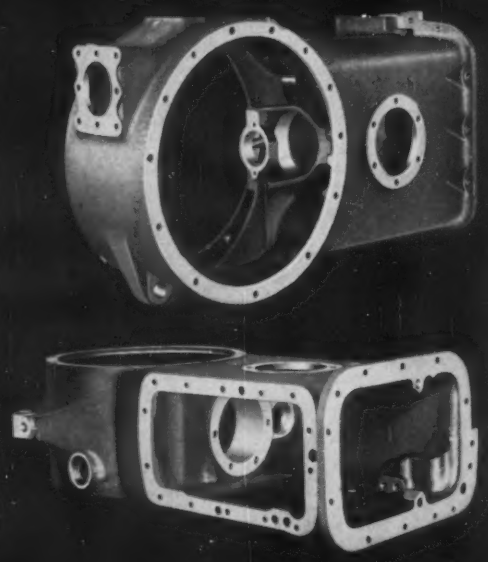
Tractor Differential Housings from Rough Castings to Assembly!

Another Transfer-matic by Cross



The new Cross Special Machine above is one of four sections which constitute a complete production line. Together, they process 46 tractor differential housings per hour from rough foundry castings to assembly. The line is 225 feet long with 31 stations. It performs 313 operations, including 19 milling, 7 cross-facing, 110 drilling, 17 boring, 72 chamfering, 4 spot-facing, 8 reaming and 76 tapping.

Like all Cross machines, the parts—even tooling details—are made to interchangeable tolerances for fast, easy maintenance and to provide flexibility for model changes—an important Cross advantage both from the standpoint of operating costs and investment. This production line is another example of Cross Sectionized (Segmented) Automation.



Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

THE FERRY CAP

countr-bor

Trademark

SCREW

A NEW, REVOLUTIONARY DESIGN
FOR SOCKET HEAD SCREW APPLICATIONS

OFFERING THESE
NOTEWORTHY ADVANTAGES:

1. Takes standard 12-point socket wrench.
2. External wrenching instead of internal.
3. Stronger—more gripping surface.
4. Permits greater wrenching torque.

Packaged goods being readied for distributors

In brief—a quality product which will do everything required of socket head screws—*and more.* For all counterbore applications.

Wherever the Ferry Cap Countr-Bor Screw has been tried, users are enthusiastic—saying that these screws are a service man's dream and the best development in socket screws in recent years. They will help you lick tough assembly problems where socket screws are required.

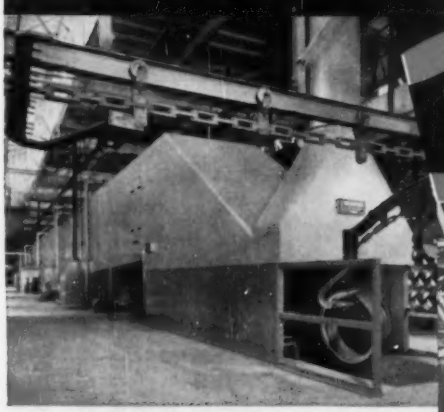
We shall be glad to send samples, prices and complete information promptly upon request.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

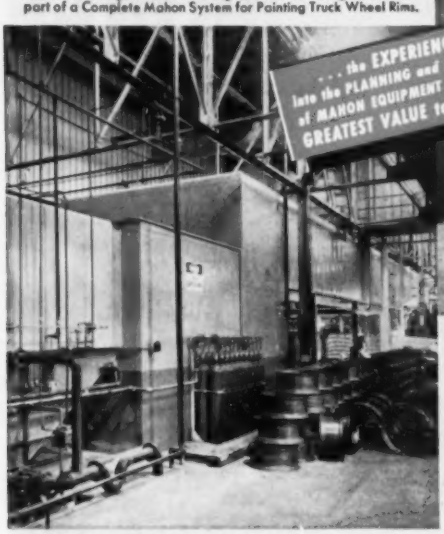
THE FERRY CAP & SET SCREW COMPANY
2157 Scranton Road • Cleveland 13, Ohio

COMPLETE *Finishing* SYSTEMS

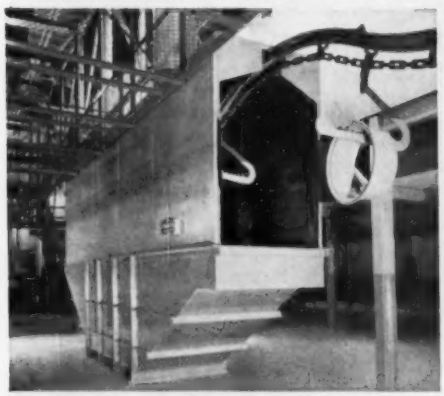
. . . for ENAMELS • LACQUER • PAINT • VARNISH



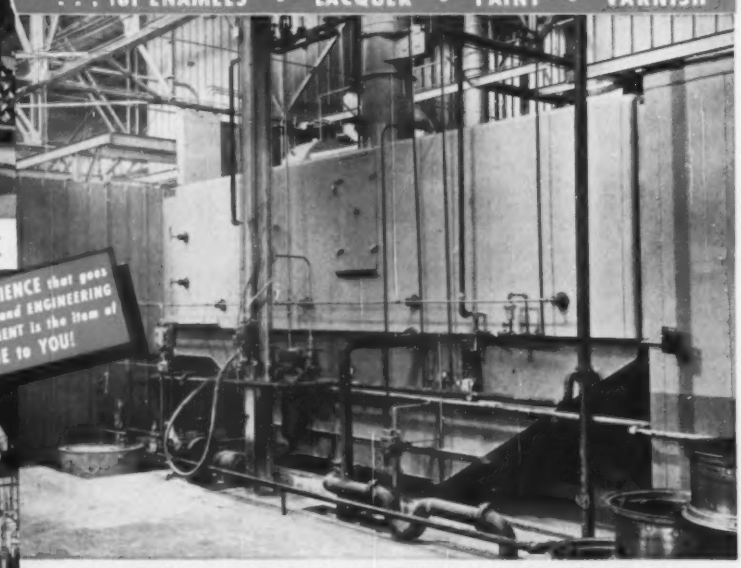
Mahon Six-Stage Metal Cleaning and Rust Proofing Machine—part of a Complete Mahon System for Painting Truck Wheel Rims.



Mahon Overhead Finish Baking Oven with Drip Enclosure and end of Dip Coater in foreground—part of the same Rim Painting System.



Mahon Dip Cooling Unit designed to expedite cooling of Rims emerging from Finish Baking Oven to handling temperature.



Mahon Dip Coater—part of a Complete Mahon Finishing System for Painting Truck Wheel Rims. Paint Mixer and other facilities are provided to maintain Epon Paint at constant temperature.

Complete Mahon DIP COATING System Finishes Truck Wheel RIMS at MINIMUM COST!

Illustrated here are major units of processing equipment which, with other facilities, make up a Complete Mahon Finishing System designed especially for coating truck wheel rims with Epon Paint. The system includes a Six-Stage Metal Cleaning and Rust Proofing Machine, Cooling Tunnel, Dip Coater, Ventilated Drip Enclosures, Filtered Air Supply System, an Overhead Finish Baking Oven and a Dip Cooler. This is another typical Mahon solution for a manufacturer with a particular finishing job . . . it produces a fine finish in minimum time with a minimum of attention, and at an absolute minimum cost per unit painted. If you have a finishing problem, or are contemplating new finishing equipment, you, too, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified also, to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. Whether you require a Complete Finishing System for Spray Painting—either Manual or Electrostatic, Flow Coating or Dip Coating, you will find, if you investigate, that Mahon equipment will serve you better . . . because, Mahon equipment is engineered better and built better for more economical operation over a longer period of time. You can rely on Mahon to do the complete job on one contract—undivided responsibility for the entire system insures proper coordination and safeguards you against complications which may upset your production plans and subsequent schedules. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

an important weapon in America's arsenal

THE WORLD'S LARGEST STEAM DROP HAMMER

Under a contract with the United States Government, Erie Foundry Company has recently delivered the eighth 50,000 lb. Steam Drop Hammer, the largest ever built.

Here are some of this all-steel hammer's dimensions:

Weight: 1,650,000 lbs.
Height, overall: 45 ft.
Height, floor line to top: 28½ ft.

The hammer was completely machined and assembled for factory pre-testing (a standard Erie Foundry Company procedure on all machines) in Erie Foundry's plant—a modern factory which is equipped with new giant machine tools to handle such large work.

Of special interest to hammermen is the 25 to 1 anvil ratio. The added anvil weight more fully utilizes this hammer's tremendous impact energy of 850,000 foot pounds. Like all Erie hammers, all stressed parts on the 50,000 lb. machine are *steel.*

With eight 50,000 lb. Erie Steam Drop Hammers in service and stand-by, our country is ready to forge the larger component forgings needed in the weapons of today and tomorrow.

the greatest name in forging hammers

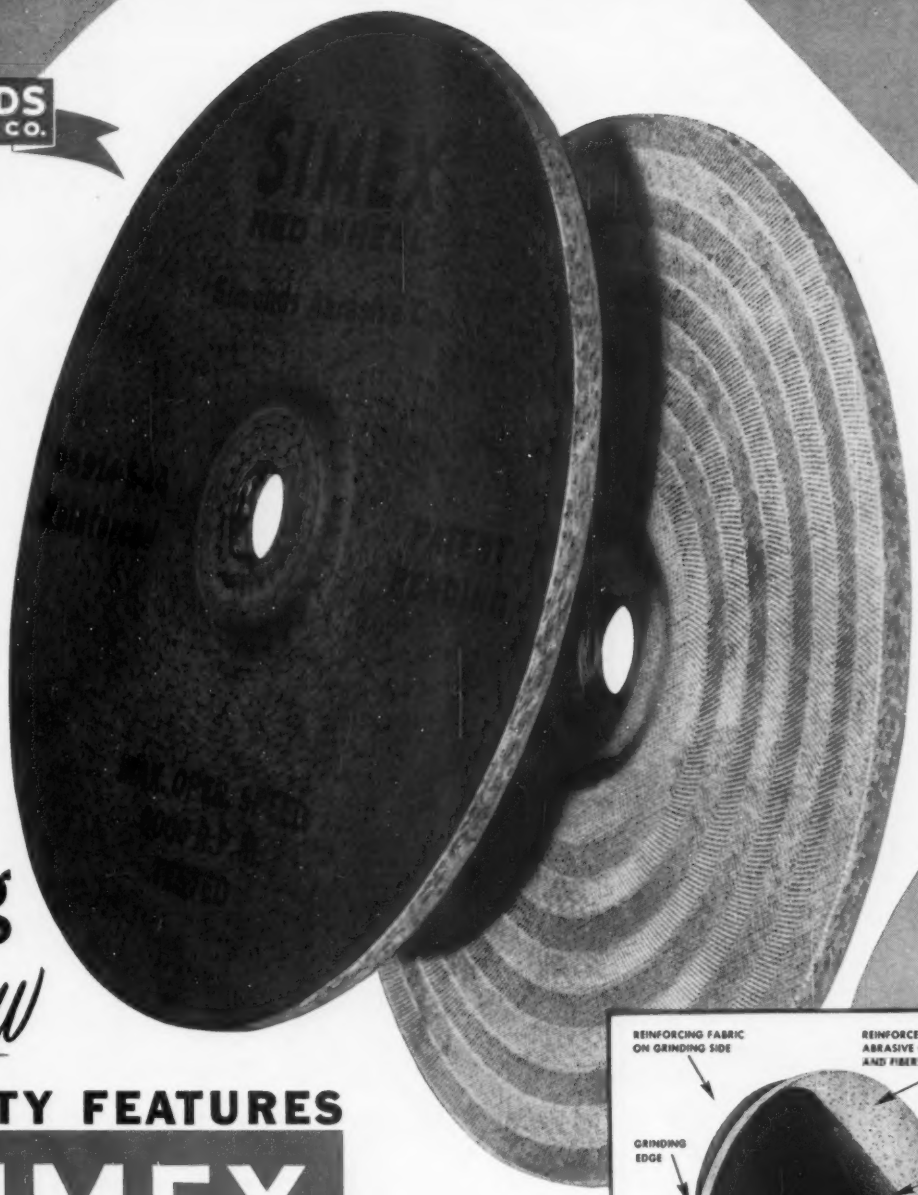
ERIE

in our 61st year

WRITE FOR BULLETIN 355

ERIE FOUNDRY CO. ERIE, PA.

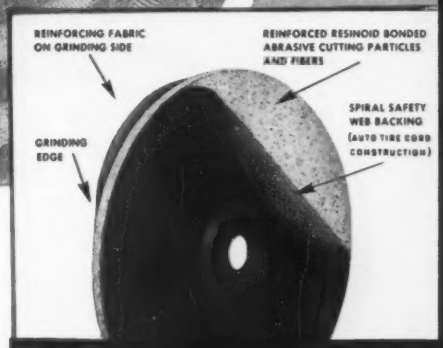
SIMONDS
ABRASIVE CO.



new

extra strong with *new* SAFETY FEATURES

SIMEX® RED WHEEL


REINFORCING FABRIC ON GRINDING SIDE
REINFORCED RESINOID BONDED ABRASIVE CUTTING PARTICLES AND FIBERS
SPIRAL SAFETY WEB BACKING (AUTO TIRE CORD CONSTRUCTION)
GRINDING EDGE

Structurally different

for production grinding, weld grinding, cleaning-up

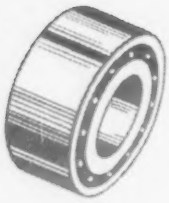
Lightweight, rigid and reinforced resinoid bonded, this new faster cutting abrasive wheel, stands up safely to any directional stress. Wheel mass is reinforced throughout with thousands of alpha cellulose fibers. Top side has extra safety web backing of spiral wound rayon auto tire cord. Grinding side has knurled pattern for extra cutting speed and fiber layer for added strength.

SEND FOR BULLETIN ESA-244

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

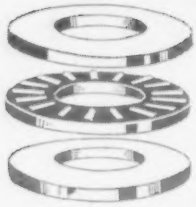
Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco. Distributors in Principal Cities
Division of Simonds Saw and Steel Co., Fitchburg, Mass.

Extra Savings
FROM YOUR
SIMONDS DISTRIBUTOR'S
STOCK • SERVICE • KNOW-HOW



1918

First solid cylindrical roller bearings for steel mill motors



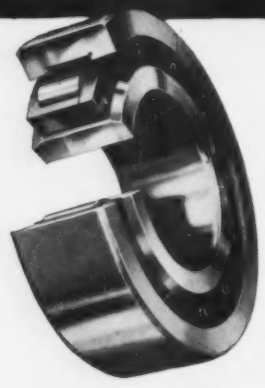
1925

First solid cylindrical roller thrust bearings for crane hooks

solid cylindrical roller bearings

for every type of steel mill operation . . .

FOR HEAVY DUTY

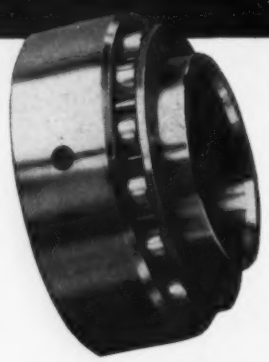


Radial Type, Bronze Retainer

Thrust Type, Bronze Retainer

For Dependable Performance at Moderate Cost

TRU-ROL, Segmented steel retainer

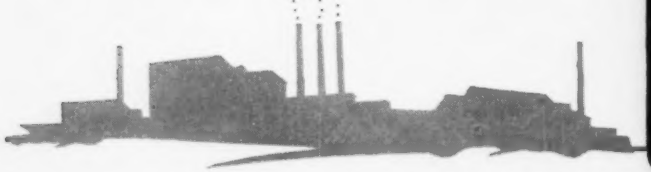


Metric Series, steel cage—Trunnion-End Rollers

● Continuing its early pioneering, Rollway has developed various types and sizes of roller bearings for roll necks, shears, lorry cars, screw-downs, skelp mills, runout tables, charging buggies and ladle cranes. Standard Rollway bearings have been especially serviceable in bridge wheels, trolley wheels and ingot cars.

Along with its bearing development, Rollway's engineering service has greatly increased in efficiency. This no-cost, no-obligation service is available at all times through your nearest engineering office or authorized Rollway distributor.

ROLLWAY BEARING CO., INC.
553 Seymour St., Syracuse 4, N. Y.

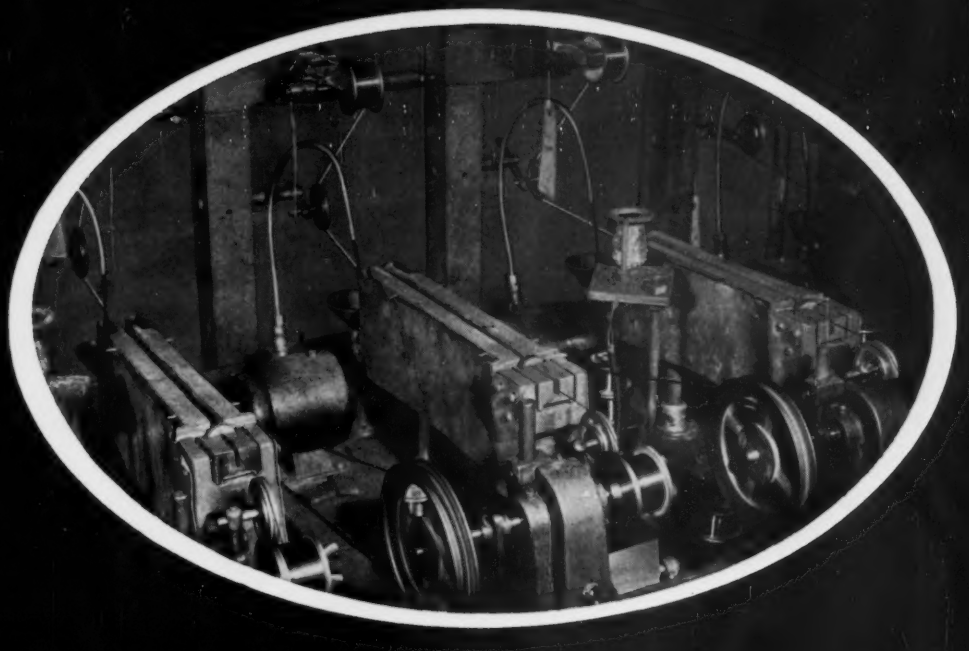


ROLLWAY BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

dag
DISPERSIONS®



Die life extended with 'dag' dispersions

Use **'dag'** Colloidal Graphite when drawing fine wire through diamond dies: it is the only substance which will adhere to the heated wire and lubricate the dies. Not only does this *dry lubricating film* extend the life of the dies, but it produces wire of uniform diameter without the scoring and breakage frequently encountered with inferior lubricants.

Tungsten and molybdenum, notably difficult to work, are easily drawn through dies lubricated with a dilute mixture of **'Aquadag'®** and sugar solution.

To lubricate dies used in forming steel wire, a dilution of **'Prodag'®** and water is recommended. Users report more than 2200 pass-pounds per gallon of mixture with no graphite visible on the finished wire.

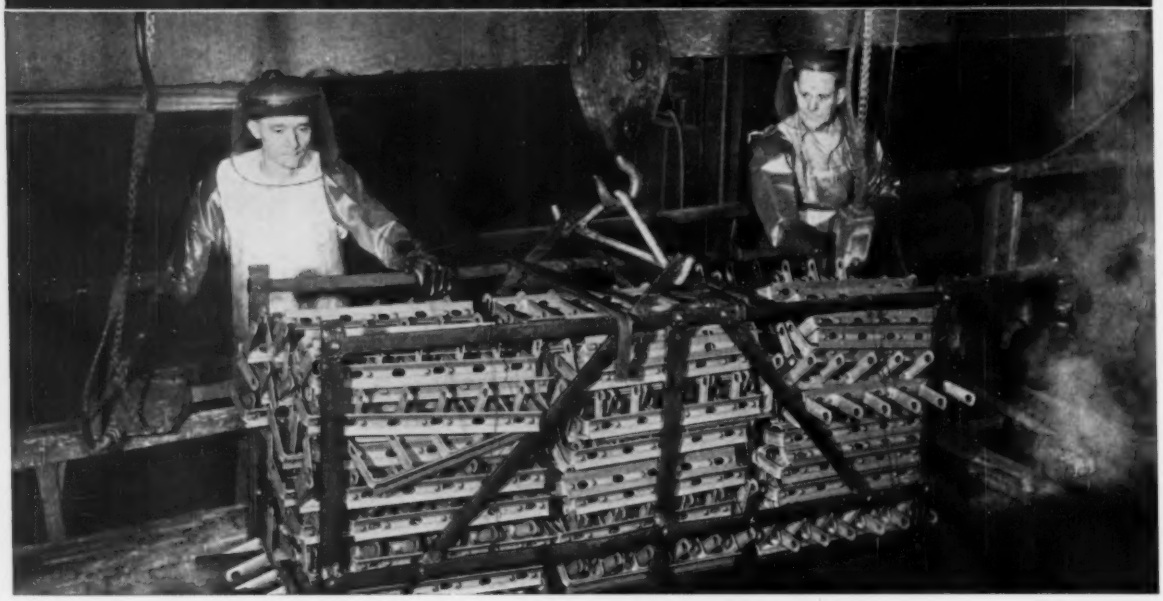
'dag' dispersions are also used profitably in forging, stamping, deep-drawing, piercing, casting, and stretch-forming. Write for our free booklet on **'dag'** Colloidal Graphite for Metalworking Operations, Bulletin No. 426-Z2.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

use 'dag' dry films for trouble-free lubrication

ACHESON COLLOIDS COMPANY
PORT HURON, MICHIGAN
...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

How's this for corrosion control?



Carpenter Stainless No. 20 pickling rack still in H_2SO_4 service after 5½ years!

Steady exposure to 5-15% sulphuric acid at temperatures up to 200°F for over 5½ years is the service record of this pickling rack made from Carpenter Stainless No. 20. It supports heavy loads of pole line hardware during pickling. Dependable corrosion resistance in the steel is invaluable.

Ordinary steels lasted but a short time on this application. Then, Carpenter Stainless No. 20 was put to work. The result is added safety for the workers, substantial savings in replacements, and uninterrupted production.

Today industry is finding a host of uses for this super corrosion-resisting steel. A wide variety of products of No. 20 can be purchased already fabricated . . . or you can build your own. In addition to hot sulphuric acid, this unique steel resists attack by a long list of other corrosives.

Whatever your corrosive application, talk to Carpenter first about the cost-saving advantages of No. 20. Over 70 years' experience in the development and manufacture of specialty steels are at your service when you contact your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Partial list of Stainless No. 20 products now being fabricated:

- Agitating equipment
- Baskets
- Centrifugal pumps and parts
- Coils
  - Heating and cooling
- Dehydrators
- Exchangers, Heat
- Fans
- Fastenings (all types of standard and special design)
- Fittings
- Grommets
- Hangers
- Instruments
  - Heat and temperature
  - Industrial liquid level
- Mixers
- Nozzles
- Pails for sulphuric acid
- Pipe
- Processing equipment (food and chemical industry)
- Pump parts
- Screws
- Tanks, welded
- Thermocouple wells
- Tube
- Valve parts
- Valves
- Vessels, welded
- Weld rods
- Wire
  - Baskets
  - Cloth
  - Stranded
- And others

Carpenter Stainless No. 20-Cb is available from The Carpenter Steel Company, Alloy Tube Division, Union, New Jersey, in the forms of tubing, sheet, strip, pipe and plate; and Stainless No. 20 in the forms of bars, billets and wire.

Our new leaflet "Positive Protection" has a more complete list of available products made from No. 20. If you haven't a copy, please drop us a line.

Carpenter STEEL

Super Corrosion-Resistant Stainless

Pioneering in Improved Tool, Alloy and Stainless Steels Through Continuing Research

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

A NEW PLANT

TOLEDO

FOR A NEW 20th Century *persuasive abrasive*

Recently we put our new Toledo, Ohio plant into production. It is specifically designed for you.

From laboratory microscopes to grading screens, every facility of this plant has been selected to furnish you the best metallic abrasive for the lowest possible price.

This modern factory — The Toledo Steel Shot Division — will be devoted to the production of a brand new steel shot, Toledo REALSTEEL — the newest member in our complete line of 20th Century quality shot and grit.

Write for our newest literature.

The CLEVELAND METAL ABRASIVE Co.

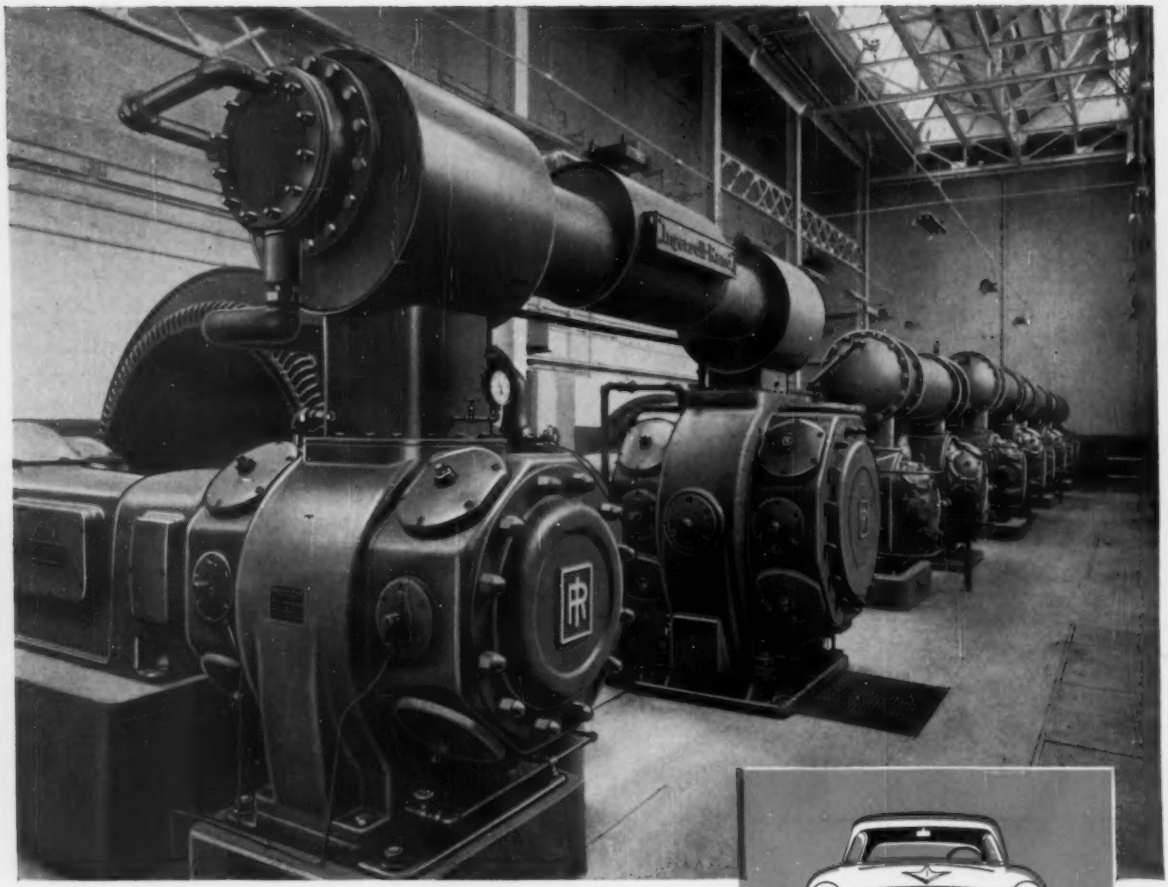
832 East 67th St., Cleveland 8, Ohio

Howell Works: Howell, Michigan

Toledo Steel Shot Division: Toledo, Ohio

One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)

*Copyrighted trade name



Streamlined Air Power Plant

behind the streamlined NEW HUDSON

Modernized compressor room at Hudson Division of American Motors simplifies operation and maintenance

AT Hudson, improvement of plant and product go hand-in-hand.

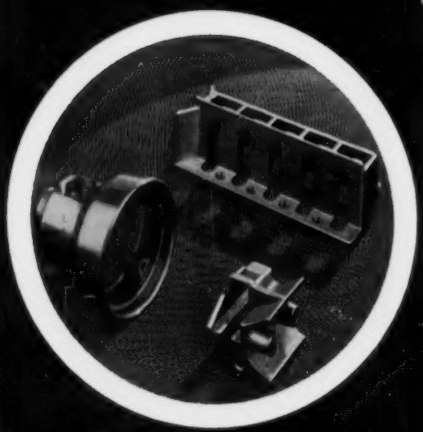
Here, the compressed air plant previously consisted of one steam- and four electric-driven compressors, in three different locations. The old steam-driven unit, which had out-lived its value as a dependable standby, was replaced by a new Ingersoll-Rand 3,000 cfm PRE compressor. All five electric-driven compressors were then installed in a single building, with receivers and aftercoolers in the basement directly below. This compact installation is shown above, with the new PRE unit in the foreground. The four other compressors are also Ingersoll-Rand PRE units. Although more than 25 years old, they were found to be in such excellent running condition throughout that there was no need for replacement.

Wherever you need thoroughly dependable, low-cost air power, it pays to specify Ingersoll-Rand. Your I-R representative will be glad to show you why—and give you full details on any type of air or gas compressor. Helping you is his business!

Ingersoll-Rand

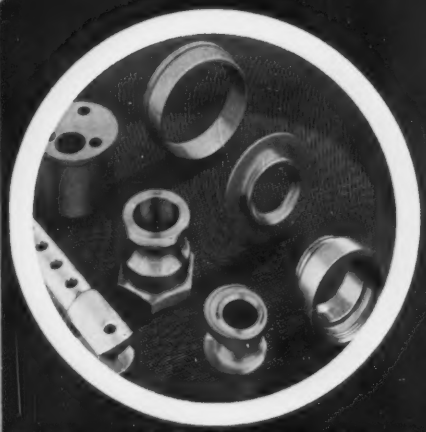
I–260 11 Broadway, New York 4, N. Y.

COMPRESSORS • CONDENSERS • AIR & ELECTRIC TOOLS • PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES



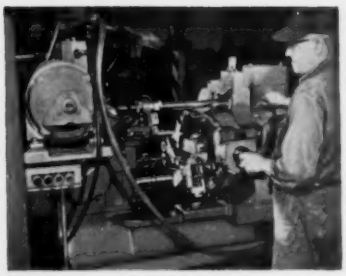
Titan brass pressure die castings

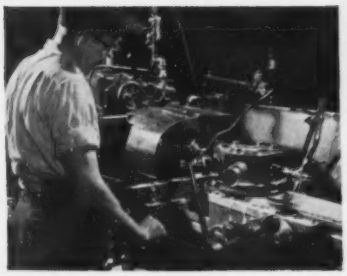
Titan brass and bronze forgings



Titan brass and aluminum hand screw machine parts

One of Titan's modern automatic chucking machines for preparing brass and aluminum forgings to customer specifications. Titan performs all types of machining operations.





Accurately machining a Titan forging on a turret lathe. Titan fabricating operations cut customers' assembly costs.

Titan machined parts

have sparkle, economy and versatility

Appeal and usefulness of brass or aluminum forgings and pressure die castings are increased greatly by multiple drilling, reaming, tapping, gang-milling, turning, broaching or knurling at the skilled hands of Titan machinists.

Equipment includes turret lathes and automatic chucking machines for producing finished machine parts of volume, quality, economy and superb finish. For example, high-quality forgings are supplied by Titan ready for assembly—already precision-broached and gang-milled with multiple-drilled and tapped holes.

When smaller quantities of fabricated parts are needed, Titan hand screw machine facilities come into play. Here, holding to closest tolerances and precision requirements is regular practice.

Let us suggest how Titan machined parts may solve your assembly problems and cut costs. Write for more information. And send for new 40-page full-color booklet "Behind the Scenes." Use the coupon below.

Dept. B

Titan Metal Manufacturing Co., Bellefonte, Pa.

Gentlemen: Please send 40-page booklet "Behind the Scenes."

Name_____

Title_____

Company_____

Street_____

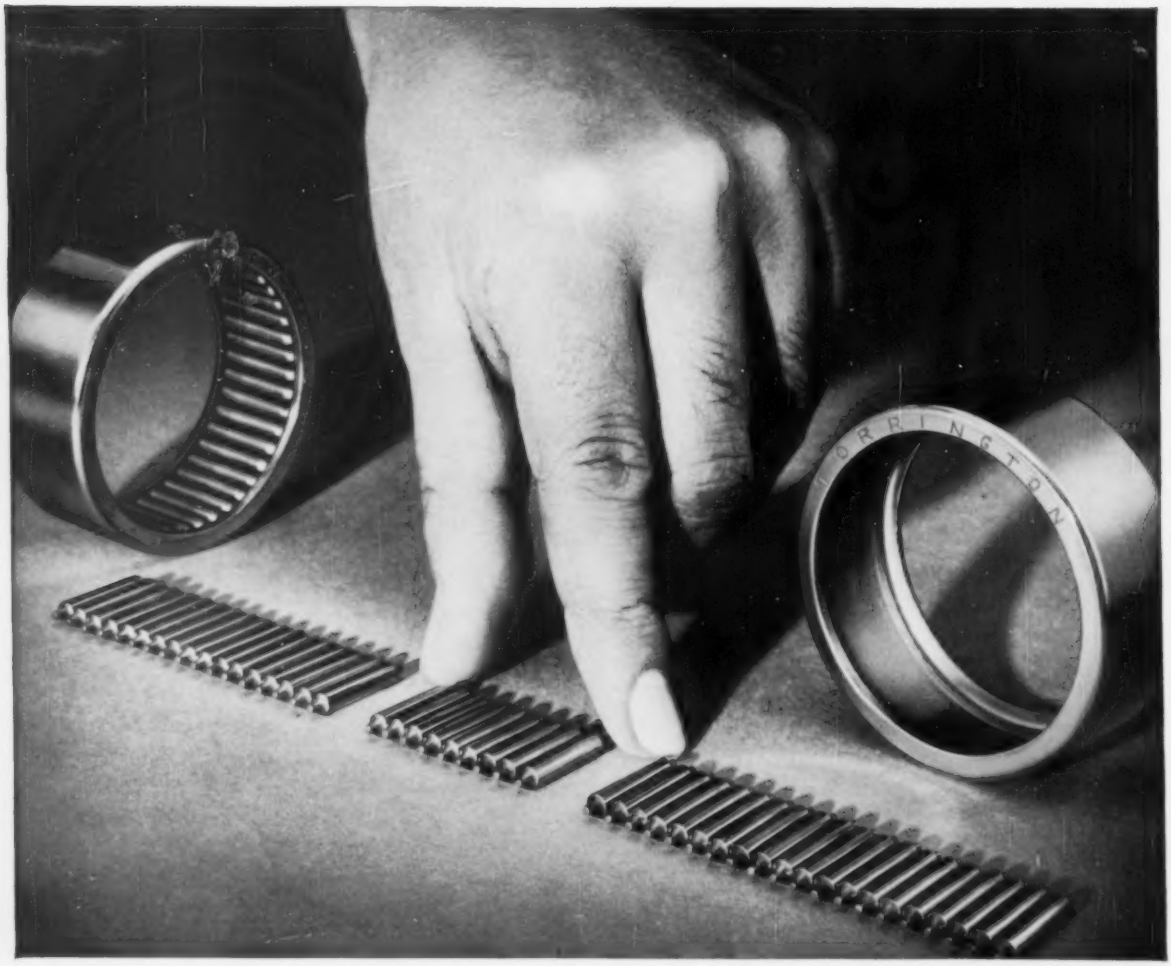
City & State_____

Titan®

METAL MANUFACTURING COMPANY

Bellefonte, Pa. Offices and Agencies in Principal Cities

RODS · FORGINGS · DIE CASTINGS · WELDING RODS · WIRE



"Here's where the **TORRINGTON NEEDLE BEARING** *gets its high load capacity"*

The radial load capacity of an anti-friction bearing depends, in the final analysis, on the number of lines or points of contact made by the bearing surfaces in the load zone. This is where the Torrington Needle Bearing really shines.

With its full complement of precision-ground rollers, the Needle Bearing gives many more lines of contact than other types of anti-friction bearings. Thus for a given size, the Needle Bearing has a *greater* radial load capacity than other bearings.

What does this do for your product? The Needle Bearing can give you the benefits of its high-capacity performance for little more than the cost of a plain bearing; it can help you reduce the size and weight of surrounding members without sacrificing shaft strength, thickness or rigidity.

For twenty years, our Engineering Department has helped designers and manufacturers throughout industry to adapt the unique advantages of the Needle Bearing to their products. Let us help you make the Needle Bearing "standard equipment" in yours.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.

TORRINGTON NEEDLE BEARINGS
Give you these benefits

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

THE TORRINGTON COMPANY 90th ANNIVERSARY 1865 - 1955

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Wagner®
CRANE-BRIDGE BRAKES
...the choice of leaders in industry

131 CRANES
at Aliquippa...
all equipped with
Wagner
Hydraulic Crane Brakes

There are 131 overhead traveling cranes in operation at Jones & Laughlin's Aliquippa Works and *all* of them are equipped with Wagner Hydraulic Crane Bridge Brakes.

This is because J&L is interested in safety, economy, and ease of crane brake operation. J&L has found that Wagner crane bridge brakes rank high in these three considerations.

The 75-ton Bessemer crane shown here is equipped with Wagner *Powered* Hydraulic Crane Bridge Brakes. These brakes are:

SAFE because cranes can be controlled without bridge motor plugging which causes damage to both motor and gears. Parking brakes can be set automatically in case of power failure.

ECONOMICAL because operators are less likely to drag *powered* brakes. There's less wear on wheels and lining... life of equipment is prolonged. Several brakes can be operated from one pedal so it's easy to step up production.

EASY-TO-OPERATE... tip-toe braking... finger-tip parking... one-minute bleeding.

Wagner power units can be added to your present Wagner Hydraulic System. Only six weeks are required to fill the average order. Bulletin IU-36 gives full details—write for your copy today.

Type H or HM2 Brake Unit

Hydraulic power unit driven by totally-enclosed motor

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6403 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

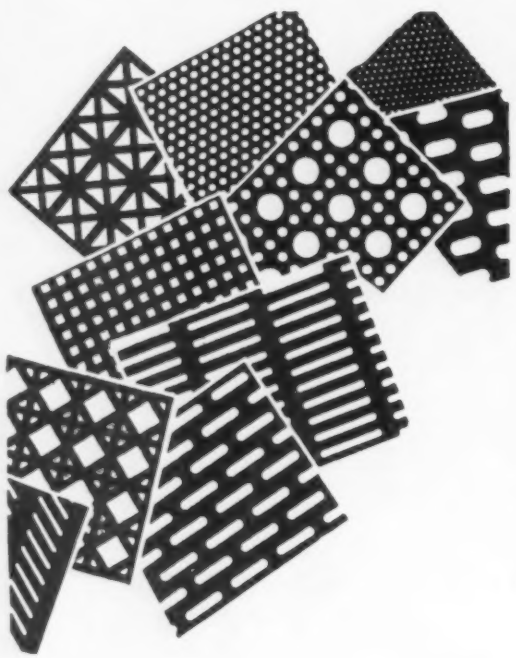
BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

155-3

PERFORATED METALS for Every Purpose

INDUSTRIAL AND ORNAMENTAL



Steel, Brass, Copper, Monel, Bronze, Aluminum, Zinc, Lead, Stainless Steel and all metals or materials punched as required and for all kinds of screens.

We can guarantee perfectly flat sheets free from buckles and camber.

Write for Catalog

CHARLES MUNDT & SONS
59 FAIRMOUNT AVE.
JERSEY CITY, N.J.

A plant manager asks 3 leading questions about V-belts

1 "I stock 85 different sized sets of belts—how can Veelos help me?"

With *four* 100′ reels of Veelos (O, A, B, C widths) you can replace as many as 316 different sizes of endless belts —and store your Veelos in *inches of space!* Veelos cuts your inventory to a minimum. No obsolescence or deterioration, no worries about specific sizes. With Veelos, your storage and inventory problems are licked!

2 "How does Veelos cut installation and down-time?"

Veelos is an *adjustable belt.* With Veelos, there's no tearing down outboard bearings, no resetting, tilting or moving motors to make belt replacement or repairs! And you don't have to replace a complete matched set because of one loose belt—Veelos belts adjust to any length, can be altered by adding or removing links!

3 "How do I eliminate costly belt vibration?"

Install Veelos in place of ordinary belts! Veelos belts are absolutely uniform; every stud and link is identical; every foot of the reel is identical and uniform; they're perfectly balanced. Your Veelos salesman can easily prove to you with a Veelos Vibration Analyzer (tested against any V-belt you might now be using) that Veelos *cuts vibration up to 90%!*

VEELOS
THE BALANCED
LINK V-BELT

Veelos is known as Veelink outside U.S.A.

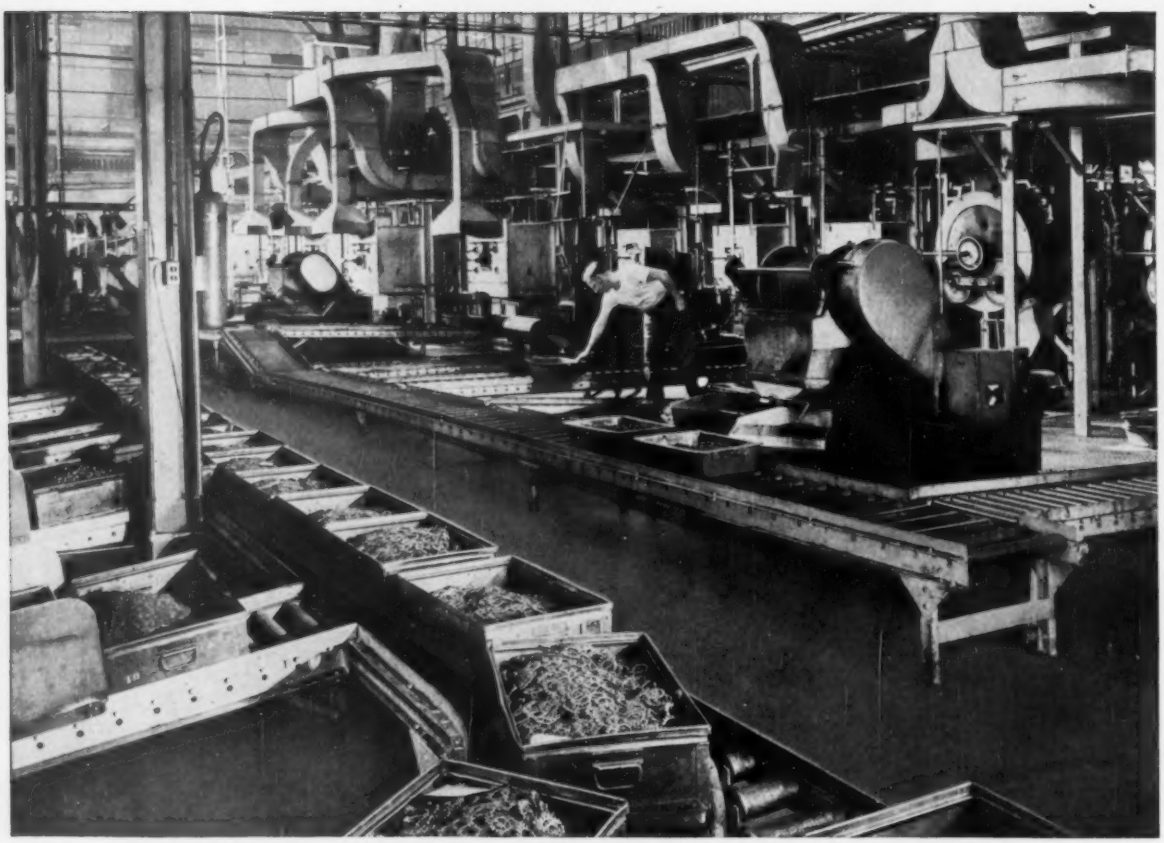
Get your free Veelos Data Book; many pages of important information on belt drives. Write to:

MANHEIM
Manufacturing & Belting Company
108 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists Since 1911"

© M.M.&B. Co. 1956

Adjustable to any length • Adaptable to any drive • Balanced power • Constant power • Vibrationless power



At low heat-hour cost . . . Nichrome muffles give thousands of hours of high temperature service in gas furnaces manufactured by the American Gas Furnaces Company, Elizabeth, N. J., in operation at plant of Shakeproof Div., Illinois Tool Works, Elgin, Ill.

Nichrome muffle . . . able to handle corrosive gas for 5½ years at 1600°F

HANDLING A CORROSIVE MIXTURE of city gas and ammonia, a Nichrome muffle used for heat treating small steel parts completed 36,732 hours of almost uninterrupted service at 1600°F.

But this temperature is no severe test for Nichrome. Even at higher temperatures, under normal heating conditions you'll find little deterioration of this 60% nickel-15% chromium-iron alloy.

Actually, the big story about a Nichrome muffle is its ability to withstand "thermal shock." Shock from repeated alternate heating and cooling. And shock from intermittent charging of cold work.

Naturally, the 60% nickel content in Nichrome produces significant effects. For one thing, it improves load-carrying characteristics at elevated temperatures. Equally important, the nickel addition plays a major role in improving resistance to scaling from common industrial atmospheres.

A typical Nichrome* muffle, produced by Driver-Harris Co., Harrison, N. J. Nichrome muffles of this type weigh from 291 to 2775 lbs., depending on furnace size and function.

*Reg. Trademark of Driver-Harris Co.

That's why you find Nichrome muffles, retorts and other heat treating components used extensively for nitriding, for carburizing, for oxidation . . . for handling reducing gases, and for operations involving high temperature fatigue.

If you have a metal problem, we'll be glad to help with our wide practical experience. No matter what your industry, send the details of your difficulty for our suggestions. Write us now.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

we do **one** thing—

and we do it very well!

STRIP STEEL production is our specialty. From this you gain special benefits: experienced counsel on your strip applications...dimensional exactness...uniform quality, to speed product fabrication...the finish you want, in every coil. For superior quality and superior service in stainless, spring, alloy or clad metal strip steels *call Superior!*

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

What's Ahead in Steel Service

Many new products and service facilities have been added at Ryerson during the past few months. Many more are in prospect for '56. Here's a review and a look ahead:

NEW STEELS—Three new Ryerson leaded alloys—Rycut 20, Rycut 40 and Rycut 50, were introduced during the past year. Additional sizes of these amazingly fast-cutting alloys have recently been added to our stocks—further additions are in store. Leaded plates, available only at Ryerson, have just been introduced and these New E-Z-Cut plates soon will be on hand in larger tonnages. Other recent additions to Ryerson stocks: Stainless plates and sheets in extra large sizes, welded pump-cylinder tubing, mansard pattern siding in stainless, galvanized and carbon steel, 8615 alloy steel plates for case hardening applications.

NEW SERVICE FACILITIES—Ryerson service facilities are never completed—modernization and expansion go on continuously. A few 1955-56 examples: a brand new Connecticut plant, additional facilities doubling stock and service capacity at Boston, a 30% increase in facilities at Buffalo, new cut-to-length lines at New York and Boston, greatly augmented shearing equipment at Chicago, more plant area at Los Angeles, Detroit and Spokane.

NEW QUALITY PROTECTION—Now, in 1956, still more stringent quality controls are going into effect—giving you added assurance of predictable steel performance every time. And these new controls supplement an existing program of quality checks and counter checks already considered exceptional throughout the metal-working industry.

STEPPED-UP DELIVERIES—Even under the pressure of current demand, a high per cent of all regular orders for steel from stock are shipped within 24 hours—practically all within 48 hours. With expanded facilities we confidently expect to do even better in 1956!

You have helped to make 1955 another year of great progress for Ryerson. We believe we can best show our appreciation by continuing to improve our ability to serve you in the year ahead.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets & strip, tubing, alloys, stainless, reinforcing, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

FORECAST

NEWSFRONT

Scrap Reaching For $60 In '56

Price of No. 1 heavy melting scrap was over $50 per ton in some consuming areas as 1955 drew to a close. Continued strong demand plus a feverish export market increases the possibility of a $60 market some time in the first quarter. It's likely to soften later in the year in line with an expected dip in steel demand, but it looks like another good year for the scrap industry.

Labor Shoots At New Goal

Stanley Ruttenburg, new AFL-CIO Director of Education, is sending word to a long list of "friendly" congressmen that an extra $100 exemption for individual taxpayers, plus rate cuts for those making less than $7500, is a labor "must" for the 1956 session of Congress.

Nickel Picture Looks Brighter

The government has eased nickel deliveries to the stockpile for the first quarter of 1956. And there's a good possibility that ODM may not take any nickel for the entire first three quarters of 1956. Strong demand from steel, electroplaters and producers of electronic equipment will keep the market tight most of the new year.

Steel Prices To Climb

Chances are there will be two price boosts on steel during 1956—one earlier in the year to cover increases in the cost of raw materials, and the other to offset any wage and fringe benefits granted to steel labor next summer. Both base prices and extras will be affected.

Off Year Predicted For Automakers

Automakers are admitting privately that 1956 car sales will drop off, but cling to the prediction that the day of unlimited production is not too far away. To reach this goal, some big changes are planned for 1957. Hoods will be lower, wheels smaller and glass area greater.

Copper Producers Optimistic But—

General opinion in the copper industry places the figure for expected world refined output in 1956 at about 3 million tons. But there are some who disagree. The key, they say, is that all the world's mines and smelters would have to operate the full year without a serious shutdown. The inference is that with the current labor situation it can't be done.

Advice For Steel Purchasers

Keep this in mind when setting your 1956 steel purchasing policy: There could be serious trouble with steel labor this year. The important issues are supplementary unemployment benefits and the union shop. Until labor questions are settled, steel inventory is like having money in the bank.

No Ceiling Yet For Aluminum

Despite last year's all-time record for aluminum sales, 1956 will be bigger. Production of primary aluminum in 1955 amounted to more than 1.5 million tons. Basis of the optimistic outlook is the continued tight market and increase in capacity scheduled by the three major producers.

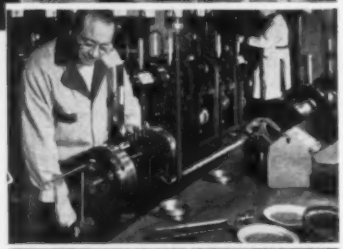
Due In Months Ahead

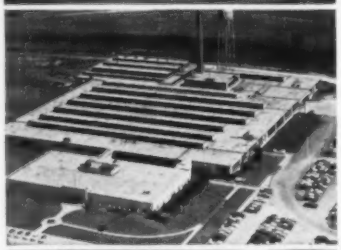
With some "bugs" to be worked out yet, a new vibrating ball mill has stirred up considerable interest among crushers of heavy materials. Demands have already been made for models of higher capacity.

Construction To Stay At High Level

Carry-over of backlogs from '55 will keep field construction humming for at least the next 12 months. New commitments are continuing on a high level, assuring the industry of activity not seen since early in the Korean War years. Full impact of contracts negotiated in 1955 will be felt early this year due to the time lag between design and construction.

Here's how C/R COOPERATIVE RESEARCH *can help you*





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Business Roundup P-136
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Government Roundup P-152
Metalworking Roundup P-160

Business Roundup

Economy is strong for 1956 . . . Many industries are sold out through entire first half . . . New demands stand ready to step in if any falter . . . Industry is entering into new expansion phase with resulting capital goods expenditures . . . Consumers have money to spend . . . Wages and take home pay climb.

◆ You will find few weak spots in the 1956 business outlook. And where these occur, new markets and demands stand ready to fill any economic gaps, assuring a year of business activity just about equal to the hectic but profitable 1955.

Many segments of business already have a full six months of capacity operations in the bag. Here are a few:

Steel is virtually sold out for the first six months.

Near capacity auto production is assured through spring.

Mounting backlogs of machine tool orders are already past six months, are rapidly climing higher.

A vigorous aircraft industry has a $14 billion backlog.

Added to these are the thriving appliance industry, expanding electrical markets, strong farm implement business, big markets in the oil country, fat outlays for defense, highways and other government spending, and a continuing construction boom, to name a few.

If you wonder who's going to pay for all this, there are encouraging statistics for assurance.

Personal income rose well past the $307 billion rate late in 1955, should be close to the $300 billion mark for the year.

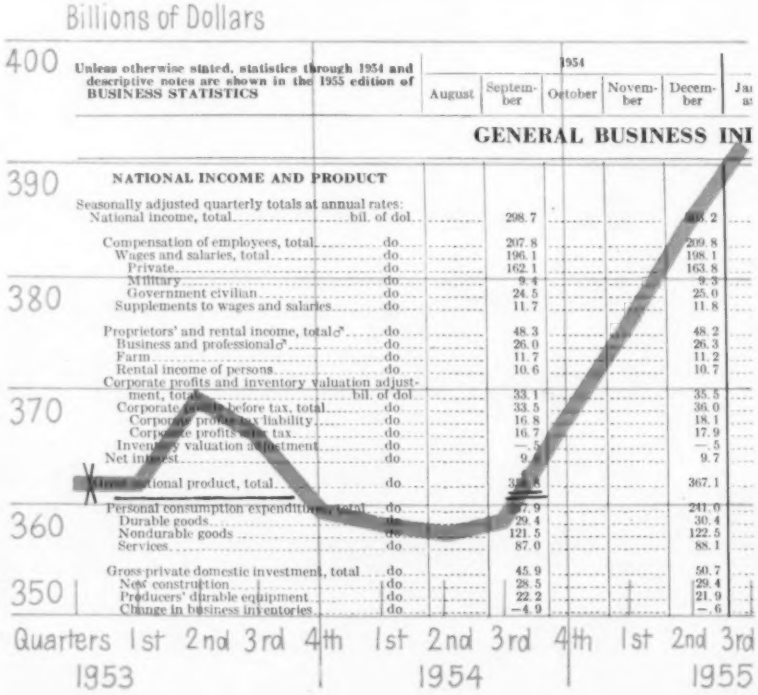
More than 67 million people were employed, with average weekly earnings for metalworking reaching $78.69. Steelworkers were averaging better than $98 a week late in 1955, auto workers over $94.

Against the strong demands for consumers' goods, the government was forced to take anti-inflation action. This was principally aimed at a tightening money market and mounting consumer credit that reached $26,699,000,000 in September, more than $13 billion of it auto paper.

Tightening credit and tougher financing are linked with the few possible weak points in the picture —possibility of faltering auto sales and new home buying. It has already become tougher to sell 1956 cars than their '55 counterparts and home builders have taken their case to Washington for easier credit terms.

But even if these two major markets slip moderately, there is a new force moving into the picture that can take up most of the slack in

Gross National Product



Unless otherwise stated, statistics through 1954 and descriptive notes are shown in the 1955 edition of BUSINESS STATISTICS

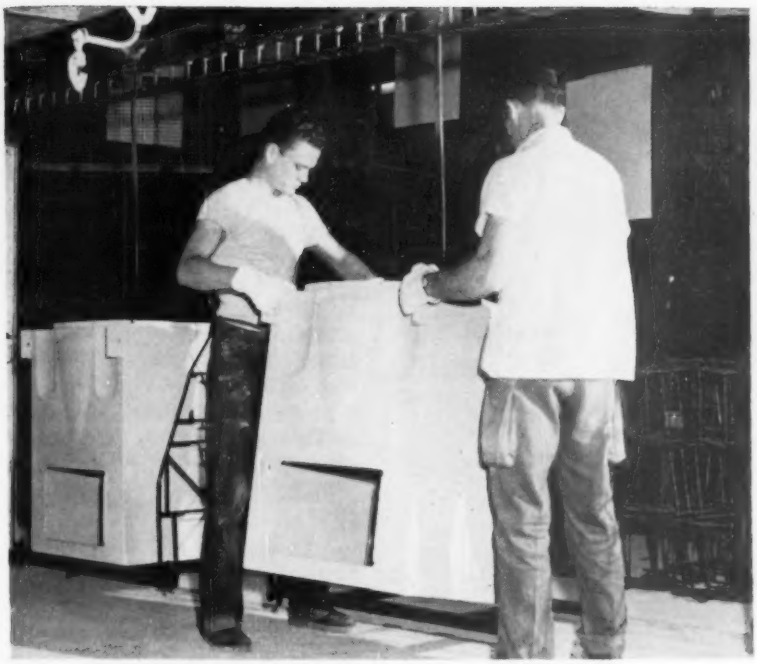
1954: August | September | October | November | December | Ja

GENERAL BUSINESS IN

NATIONAL INCOME AND PRODUCT

Seasonally adjusted quarterly totals at annual rates:

National income, total	bil. of dol.		298.7			303.2
Compensation of employees, total	do.		207.8			209.8
Wages and salaries, total	do.		196.1			198.1
Private	do.		162.1			163.8
Military	do.		9.4			9.3
Government civilian	do.		24.5			25.0
Supplements to wages and salaries	do.		11.7			11.8
Proprietors' and rental income, total[c]	do.		48.3			48.2
Business and professional[c]	do.		26.0			26.3
Farm	do.		11.7			11.2
Rental income of persons	do.		10.6			10.7
Corporate profits and inventory valuation adjustment, total	bil. of dol.		33.1			35.5
Corporate profits before tax, total	do.		33.5			36.0
Corporate profits tax liability	do.		16.8			18.1
Corporate profits after tax	do.		16.7			17.9
Inventory valuation adjustment	do.		−.5			−.5
Net interest	do.		9.4			9.7
Gross national product, total	do.		363.8			367.1
Personal consumption expenditures, total	do.		237.9			241.0
Durable goods	do.		29.4			30.4
Nondurable goods	do.		121.5			122.5
Services	do.		87.0			88.1
Gross private domestic investment, total	do.		45.9			50.7
New construction	do.		28.5			29.4
Producers' durable equipment	do.		22.2			21.9
Change in business inventories	do.		−4.9			−.6



HOME LAUNDRY market guarantees good appliance sales throughout year.

consumer spending. This is in the form of increased capital goods outlays.

Industry is entering into a major expansion phase brought about by inability of some manufacturing to meet the demand of the 1955 market. This means billions of dollars in new plants and equipment, including tools.

Mounting costs of labor are forcing manufacturers to modernize their plants. This is behind the sharp jump in machine tool buying late in 1955.

This is why you will note a swing in emphasis on markets as the year progresses from strictly consumers' goods, which characterized the entire 1955 calendar year, to capital goods and the tools of an expanding economy later in the year.

Here is a breakdown of the various economic elements, what characterized their operations in 1955, how they look for 1956:

Automotive

The big question of the year isn't whether automakers can beat their 1955 alltime record of more than 9 million cars and trucks, but how close they can come to it.

You can bet that Detroit's top forcasters have their tongues in cheek when they say that 1956 production will be as big or almost as big as 1955. They privately believe that a 10 pct drop will be realistic while many believe that a 15 pct drop or more is more than likely.

It is obvious that facelifted 1956 models at somewhat higher prices are more difficult to sell than the freshly restyled 1955's that characterized most of the lines. Only a few divisions offer complete body changes this year and they are not among the major producers.

And there is a lot of feeling that the industry oversold itself with easy credit and fat discounts. Then there is the matter of dealer unrest almost approaching rebellion that will make it tougher for Detroit to push more cars on a reluctant dealer.

But this isn't news to the auto merchandisers, who in the past consistently proved they know their own market better than anyone else.

Fat tooling orders are already placed, or in the process of being placed, forecasting major model changes for the 1957 model year. If things get too hot for Detroit, you can bet that the model changes will be rushed. Should summer sales falter, they will be bolstered by early fall production of 57's, with all automakers racing to get their first with the most.

But meanwhile, Detroit isn't even admitting a significant drop in the market—points to natural expanding markets from replacement of the 33 million cars on the road more than six years old, the growing population, and the increase in number of two family cars.

Also looking ahead, no labor trouble looms for the auto industry. Thanks to the history-making sup-

Hidden Factors for 1956

Will Keep Boom Going

AUTOMOTIVE	Early 1957 model introductions with sweeping styling changes.
STEEL	Desperately low inventories requiring major rebuilding.
FARM EQUIPMENT	High dealer profits from second best crop year, encouraging larger inventories.
APPLIANCES	Growing demand for home laundry equipment, now more than 1/3 of appliance sales.
AIRCRAFT	New commercial orders and ventures into foreign airline fields.
MACHINE TOOLS	Higher labor costs requiring greater efficiency plus new industry expansion.

JET AIRLINERS still in mock-up stage sold commercial airlines.

plementary unemployment benefit contracts signed last spring, the auto industry faces three years of labor peace, with the only problem of the moment of making SUB work.

Appliances

Despite a drop in the number of new home starts, despite the tightening of credit that has worried proponents of installment buying, appliance makers are predicting another strong year.

It will be a tough competitive year, but appliance makers are used to it. In 1954 they predicted a strong year, and despite a general slowing of business activity, they got away with about what they predicted. Pretty much the same thing happened in 1953, a year that collapsed in its late months, but late enough so it still carried many industries to records.

Beginning 1956 has somewhat the same look of 1953. Inventories in dealer and distributor hands are higher than at any time in the past 18 months. Appliance factories continue at a booming output level, and are urgently in need of more steel to satisfy their current manufacturing rate. But, if appliance builders say they can outperform the boom levels of 1955, there's a good chance they will do it.

Industry estimates suggest about 4 million refrigerators sold in 1956, or at the 1955 level. Ranges are figured for a 7 pct gain. Dryers are expected to go up 18 pct, automatic washers by 3.5 pct. Freezers are expected to fall slightly in total sales during the year.

But individual forecasts indicate perhaps industry's toughest competitive year to date, though some price increases will be in line. Most are pegging their own company's performance well over the industry pattern.

An example is one home laundry manufacturer who figures a 10 pct sales gain this year over 1955, predicts his own company's sales up 30 pct. Another major producer figures his own output up 20 pct, a third expects to double sales in the next three years.

Best overall estimate—a six to 10 pct gain over 1955. Major factor in the increase will probably be automatic laundry equipment, now amounting to about a third of all appliance sales and still gaining.

Aircraft

Aircraft manufacturing will continue at present high levels through 1956.

Metalworking and metal producing companies subcontracting and supplying the aircraft industry can be sure of a steady flow of orders—will be working at full speed throughout the year.

It's a safe bet that the industry's 1956 sales will again hit $8 billion. And a $14 billion backlog on the books makes a bright outlook for the future.

Industry's biggest customer, of course, will be the military. But the expanding commercial field, pushed by intense competition of commercial airlines, has resulted in a $1.25 billion bundle of commercial orders, with more sure to come. Several more major U. S. airlines are about to sign for jetliners and turboprops.

Planemakers are also putting on a lot of steam trying to gather in foreign orders. And they are getting some of them.

Aircraft industry will be in the market for several hundred million dollars in machine tools. Reason—the big switch in 1956 military planes from "slow" 700 mph military planes to ships hitting more than 800 mph.

Farm Equipment

Look for another strong year in farm equipment, coupled with strong buying from components and raw materials suppliers. Finished goods inventories in the farm equipment industry, while running ahead of last year, are not excessive. Inventories of finished equipment vary from slightly over 1954 levels (a year notable for reducing inventories of finished goods) to less than the 1954 level.

And sales levels are higher. Raw materials and components inventories are extremely low, with the bulging inventories of materials wiped out by the unexpectedly strong level of manufacturing in 1955. The industry had figured a gain in sales in 1955 over 1954 and discontinued the raw materials inventory reductions that characterized the 1954 manufacturing year. But 1955 farm equipment sales about doubled forecasts, with the result that the industry, with some exceptions, is going into the 1956 spring season with extremely low materials inventories. Normally carrying 60 days of materials in stock, manufacturers are down to 30 days or less.

Gains of 7 to 15 pct in dollar volume of finished goods can be expected with further price increases in the wind. The 7 pct increase of late 1955 may hamper 1956 sales to some extent, but any further price boost will not come until late next fall, will have little effect on the 1956 selling year. A price rise of about 5 pct next fall is a very strong possibility.

Drop in farm commodity prices has been over-emphasized, making farm equipment sales prospects seem unduly dark. But in fact, 1955 was the nation's second largest crop year. Farm income ran $29 billion, down only 2.7 pct from the previous year. Similarly, net profits for dealers and distributors of farm equipment rose during 1955, which will encourage carrying of larger dealer inventories.

Machine Tools

Increased outlays for capital goods indicate a booming year for machine tools, probably a record peacetime year. Starting in fall of 1955, machine tool orders started pouring in, presumably as soon as visiting purchasers at the Chicago Machine Tool show got back to their plants to plan 1956 tooling.

But industry started to plan increased machine tool purchases at mid year, when it became obvious that a successful manufacturer had to (1) increase his productive capacity to meet the demands of expanding markets and (2) improve his manufacturing methods.

Industry in general is increasing its capital outlays to increase and improve production. The machine tool industry will profit heavily from these plans.

Another factor is automotive tooling for 1957 models. While nothing is in sight like the big automated engine lines of recent years, expenditures are heavy and contribute to the influx.

Defense Spending

You can expect defense spending to stay high, upwards of $35 billion. Economy bloc in Congress and the Administration will lose out, particularly in the face of failure at Geneva, in efforts to pare defense spending. The Air Force will get the lion's share, about $17 billion, Navy about $9.5 billion, and Army, $8.5 billion.

Not all of the expenditures will go for materials of war, but a large bundle will go in increased pay for troops and fatter benefits. Big spending will go toward giant B-52 bombers, jet fighters, and significant increases in purchases of guided missiles and other electronic devices of the so-called push button war. In plain language, the major expenditures will go toward the mechanization of defense.

Highways

This year some major program for the interstate highway system is bound to be adopted. No Congressman dares to go home in an election year without it. Congress will probably vote a 15-year program that will cost the government about $25 billion. State governments will put up 10 pct more for interstate roads, up to 50 pct for secondary roads.

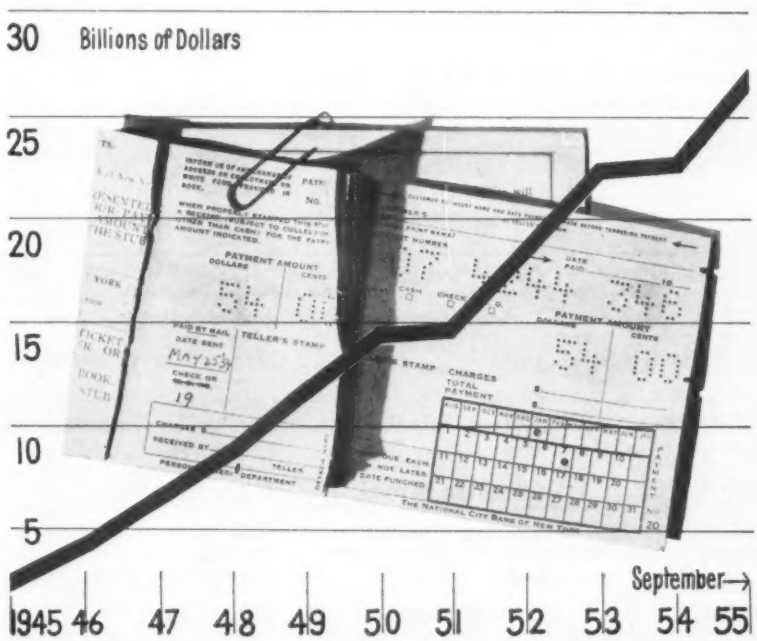
Democrats voted down the Administration's original proposal of authorizing issuance of special bonds, but will go for a pay as you go program to be financed by taxes on gasoline, tires, etc. Annual outlay will be about $2 billion a year, with more to be raised by state and local government units.

Construction

Cries of distress from builders following tightening of mortgage money by FHA and the Veterans Administration have also been overemphasized. Home construction for 1956 will hit around 1.2 million units, not a record, but still a good year. The Administration is aiming at that figure as a minimum, will relax credit curbs if the rate falls below that.

Meanwhile, construction of commercial and industrial buildings will boom, in the face of industry's expansion and improvement phase. In total construction there will be no letup, probably gains in dollar volume, but a moderate dip in new home building.

Climb of Installment Credit



Materials Roundup

Problem of obtaining the materials of metalworking will be with management most of the year . . . Steel is looking ahead to a new record on strength of first half bookings . . . Copper is still unstable in price and supply . . . New uses will consume all of aluminum's new capacity. Scrap prices highest ever.

◆ Tight supply at higher prices—that's the consumer outlook for many of the basic materials of metalworking for 1956.

More of the strong demand that brought record years in many metalworking markets in 1955—that's what the producer can count on as he looks ahead into 1956.

But the outlook isn't as cut and dried as this indicates. The scarcity is the penalty you will pay for highly profitable capacity production. The higher prices are only in line with those you will have (or have had) to pass on to your consumers because of the higher cost of manufacturing and doing business.

Purchasing and procurement of many materials will continue to be a major management headache in 1956. There will be no real relief until well into the year, if then, as business indicators point to a strong year from start to finish.

There are signs of long term easing of some at the critical points. Steel has announced ambitious plans to increase capacity at a rate of perhaps 4 million tons a year. But this will be in line with the growing economy, promises little immediate easing.

Aluminum is also in an expanding mood, but new markets and increasing demand will match the increase in supply.

The real significance of 1955 may lie in the clear case it presents of an expanding economy requiring new capacity for the materials of production.

Here is a rundown of the materials supply and market potential for 1956, together with the significant trends that developed in the past 12 months:

Steel

BIGGEST PROBLEM facing the steel industry in 1956 will be that of producing enough to meet demand. Next biggest problem will be that of labor relations. And sandwiched in between is the task of expanding capacity.

No one is qualifying his forecasts on the outlook for steel in '56. Even the usually conservative are freely predicting output in the neighborhood of 115-116 million ingot tons—about the same as 1955. Chances are good that the final figure for next year will be closer to 118-120 million tons.

Chief difference between this year and last is that 1955 was off

MATERIALS—Looking Ahead To 1956

Commodity	Current Market	1956 Developments	Price Outlook
STEEL	**Tightest possible**	**Little easing all year**	**Definite increases**
ALUMINUM	**Tight**	**Demand stays ahead of supply**	**Probable increases**
COPPER	**Extreme shortage**	**Strong demand, unstable supply**	**Uncertain, probably up**
IRON ORE	**Adequate supply**	**Big gain in imports**	**Higher**
COAL	**Gaining strength**	**Sick industry rallies**	**Stable**
SCRAP	**Tight**	**Depends on steel**	**Can't go much higher**
NICKEL	**Critical shortage**	**No relief**	**Probably up**

to a relatively slow start, picking up momentum as the months passed. The mills started 1956 at a record-breaking pace, with order books filled, backlogs heavy, and the prospect of capacity production for the first six months, at least.

If there is one single thing worrying the mills, it's Detroit. Steel producers have never quite been able to match the optimism and enthusiasm of their biggest customers—the auto manufacturers. Detroit is freely predicting another good year. But even though the car companies have been right before, steel executives are looking over their shoulders.

What if auto sales hit the skids? It won't be good, because many industries lean on automotive, and the effect would be felt throughout the economy. That's why steel people are worried.

But on the positive side, the economy generally is showing so much vitality, and consumer spending plans are so encouraging that perhaps a letdown in automotive will not materialize, or will be of minor consequence. At any rate, there are other factors likely to have a cushioning effect should the auto consumer pull the strings on his purse. Here are a few of them:

Steel inventories are low. Consumers generally have had little opportunity to rebuild them in 1955 due to (1) their own consumption pace, and (2) competition with other consumers for available steel. It's been more than hand-to-mouth for many users during the last six months.

The outlook for industry generally is good. Construction is expected to improve on '55, with commercial building offsetting an expected decline in residential housing.

Capital goods spending will be heavy. This means that machinery and equipment builders will have a good year.

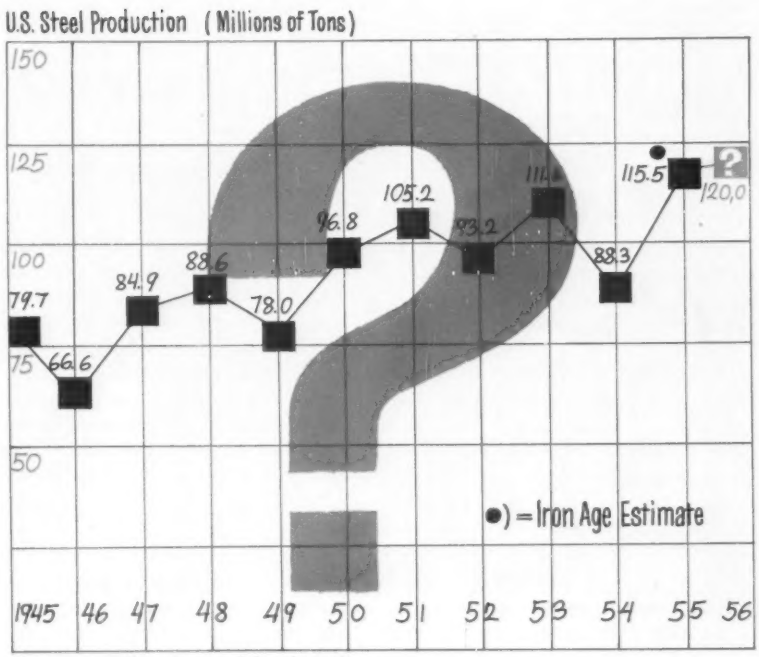
More schools, roads, and other public works will be built. Defense spending will be about the same. Farm implement buying may be off, but still respectable. Oil and gas activity will continue high.

The railroads are set for one of their biggest years. Freight car order backlog at year's end approached 150,000 cars. Further, the rails have the job of repairing some 135,000 freight cars. The building program will consume about 4.5 million tons of steel ingots over 2½ years; the repair program will require another 800,000 tons of steel.

Both producers and consumers are somewhat edgy over the labor outlook. The United Steel Workers will be asking for (1) a "substantial" wage boost, (2) Supplementary Unemployment Benefits (SUB), and (3) the union shop.

The last two issues could precipitate a deadlock that could result in a strike or a near-strike. Consumers will be stocking up before the contract deadline—just in case.

Can 1956 Top Steel's New Record?



Source: American Iron and Steel Institute

Nonferrous Metals

BECAUSE OF peak capacity in all metalworking and an unsurpassed worldwide demand for metals, all major nonferrous metals chalked up 1955 as one of their banner years. Production, shipments and sales in almost all lines were at all-time peaks, and the outlook for at least the first half of this year is equally good.

Demand from major domestic consuming industries continues unabated at high levels, and foreign demand seems as yet unslaked. This spells continued trouble for consumers of copper and nickel, with aluminum easing somewhat with new capacity.

Aluminum

PRODUCTION of aluminum last year set new records, with primary output over 3 billion lb. Over 19 pct of wrought products were taken by the building industry, almost 17 pct went into transportation equipment and over 13 pct into consumer durables.

Demand for aluminum from all consuming groups continues strong and in most cases is in excess of supply. And since aluminum is an aggressively growth-minded industry, new applications and extension of existing uses can be assumed as a matter of course. Through new products and methods, aluminum

is making consistent progress in its major markets.

Sizable expansions of aluminum capacity, both by present producers and newcomers to the field, have been announced. But the industry is confident that the market can absorb the additional production. Surveys indicate a market potential of 8 billion lb by 1965.

Prices should continue steady for the first half of the year, but a price hike following wage negotiations next summer is likely.

Copper

COPPER OUTPUT continues at or near record levels, but is still insufficient to keep up with demand. The appetite of consumers is almost insatiable.

Domestic civilian demand continues strong, with such major copper markets as construction and electric and electronics industries continuing to run at full swing.

In addition, the government has stepped up first quarter setasides for copper-base products by 8 million lb over third and fourth quarter takes to 116 million lb. And there is no reason to expect any drastic cut in the near future.

Unstable supply situation, largely based on uncertain labor, has prompted major consumers to look to substitutes.

Lead and Zinc

PRODUCERS are looking back on a year in which shipments reached 1.17 million tons, look confidently ahead to a good year in 1956. The huge number of automobiles now on America's highways makes the sales outlook to the two major consuming industries, battery makers and tetraethyl lead, exceptionally bright.

Further business probably could have been booked late in 1955, but producers were reluctant to take orders for delivery too far in the future. Fear was based on a rising London market in the fourth quarter which indicated a price increase for domestic metal.

Zinc's record year of over 1 million tons in 1955 has the industry looking ahead to continued good business at least through the first half. Thereafter, it is largely up to the automobile and steel industries.

Diecasters took a whopping 380,000 tons of zinc last year, and their biggest customer remains the auto industry, although appliance and other markets continue strong. Galvanizing lines consumed 430,000 tons of zinc in 1955 and the steel pace should continue unabated. Only the possibility of labor troubles in steel could set back zinc seriously.

While an attempt to raise the price of Prime Western last fall failed, an increase in the price of Special High Grade seems here to stay. And the higher indicates a possible boost in Prime Western.

Nickel

THIS CONTINUES to be the most scarce of the major nonferrous metals. Despite tremendous efforts, supplies are still very tight. Gray market prices and even the price of nickel scrap have climbed far ahead of the list price for nickel.

While considerable progress is being made in reducing the nickel content of some stainless steels, there is a limit to what can be done here. And as technology, both military and civilian, tends to higher and higher temperatures, it becomes apparent that the only long range relief for the nickel shortage lies in development of new alloys and extension of supply and applications of newcomers such as titanium and zirconium.

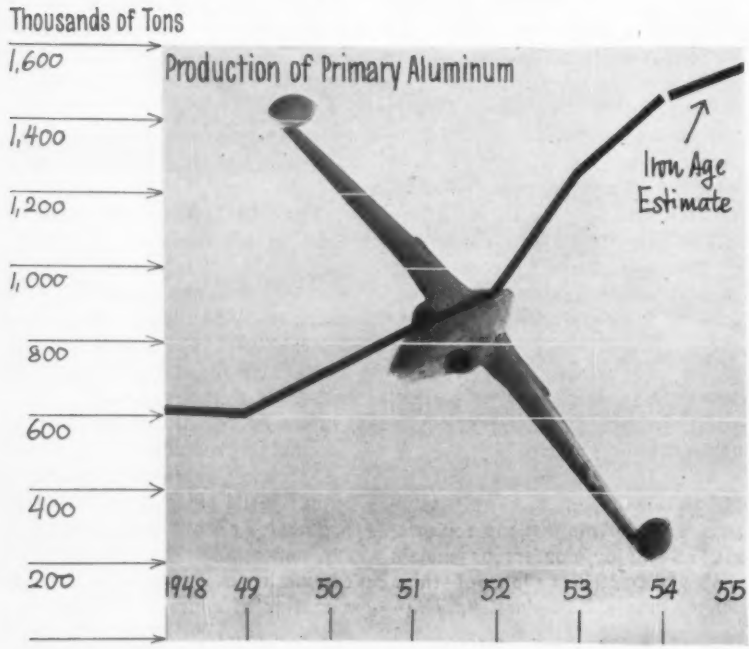
Stockpile

OF MAJOR IMPORTANCE to the nonferrous materials outlook is the government stockpile of strategic materials. The stockpile now amounts to about $5.6 billion in critical strategic materials. The government will continue to buy, but there are signs that the list of unfilled goals is beginning to shrink.

The total stockpile will consist of 75 materials and will cost $10.4 billion. About $3.4 billion in extra materials will also be purchased.

It's a question to what extent the government will continue to defer stockpile deliveries of nickel, copper and aluminum. Office of

New Uses Boost Aluminum Output



Defense Mobilization has already decided to forgive all stockpile deliveries for the first six months of 1956, hints that if the current situation remains unchanged, only token deliveries will be ordered.

Copper and zinc inventories are not as adequate as aluminum, and will add large tonnages this year.

Scrap

STEEL SCRAP prices reached record levels late in 1955 and the outlook for early 1956 is continued high level of prices and a possible scrap shortage. No slackening of mill demand is in sight. With the exception of continued high rate of industrial scrap generation, the tough winter collection season will dry up many scrap sources.

The high level of prices will bring a test of the scrap industry's contention that there is no scrap shortage. Today's high prices are calculated to bring out marginal supplies.

The past year saw consumption of purchased and home scrap jumping. Exports hit a record figure. Prices climbed upward in sudden spurts with periods of marking time in between. Mills gave ground grudgingly on prices in the face of high exports and capacity operating rates. Only most stubborn mill resistance prevented scrap prices from climbing out of sight earlier in the year. But early in December, "price is no object" conversion scrap purchases provided the breakthrough.

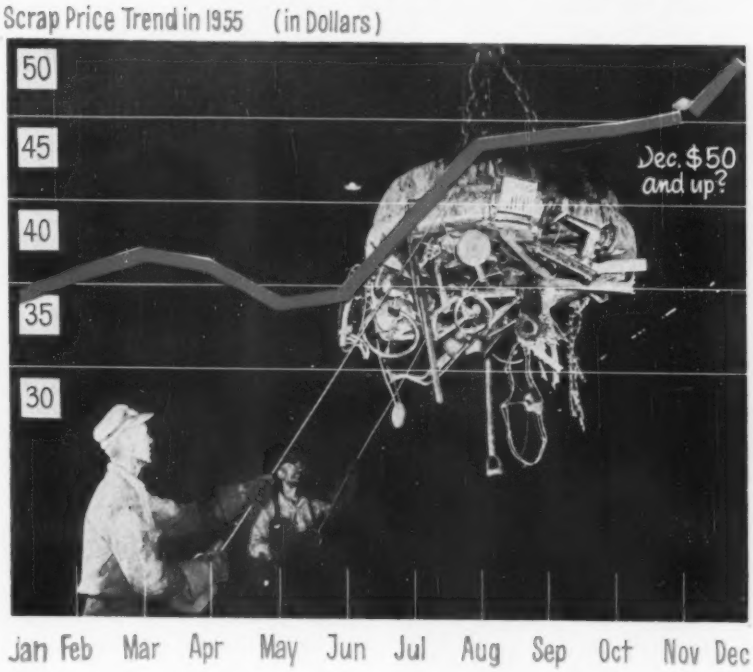
Only a slackening of steel output, not likely until late in the year, if then, can bring scrap prices down significantly. The law of supply and demand is in control. Possibility of scrap export controls are also remote in the face of State Dept. opposition. However, steel industry may renew efforts to gain some export control on the grounds of scrap as a strategic material if prices continue to mount.

Pig Iron

IRON FOUNDRIES will pay higher prices this year for pig iron, although supply will be adequate. A price hike is expected to crowd the first of the year, may even precede the steel price boost.

Pig iron production climbed over the 70 million ton mark last year after dipping to 63 million tons in 1954. Production figures to hold at current levels through the second quarter. Foundries can get what they need, but are calling for a lower phosphorous content. Supply will remain adequate, but won't loosen to any great extent. But if scrap prices drive steel mills to an even greater use of pig iron, some users may suffer.

How High Will Scrap Soar?



Coal and Coke

COAL INDUSTRY is in a stabilization period with the general economic boom and completion of new power facilities combining to keep it in relatively good shape. But looking ahead, coal and coke can see daylight for the first time in years and the industry is counting on substantial recovery.

Growth of utilities and the increases in use of electrical power provide the most encouragement for increased coal demand. Energy requirements are skyrocketing and the bulk of the increase will be provided by coal as fuel source.

Further attrition of the railroad, urban residential and small industrial markets will continue.

Iron Ore

IN DECEMBER, ore shippers were still steaming out frozen ore cars in zero weather and battling Great Lakes storms to assure adequate ore supplies for the winter. The result was a season of 87.5 million tons shipped, a record peacetime year.

The 1956 season may go even higher with an early start by independents. Incentive will be higher prices, with ore due to go up probably $2 per ton.

Foreign ores this year will probably hit an all-time high and make inroads into the Great Lakes' historic share of about 80 pct of the market.

Last year they reached 22 million tons compared with 15.7 million tons the year before. This year 12 million tons are coming from Labrador alone, four million from Europe and well over five million from Venezuela.

Considerable progress is being made towards the objective of an all-basic roof for openhearths.

Labor Roundup

Organized labor will score again in '56 . . . It will go after higher wages, more fringe benefits and extension of supplementary unemployment benefits to more industries . . . It will play important role in politics . . . Trouble looms in steel over SUB . . . Management must be ready to meet labor offensive.

◆ THIS WILL be another good year for labor. It may not be as spectacular as history-making 1955 but aggressive labor leaders, feeling their oats in a period of record-breaking prosperity, will put the pressure on in more than one direction.

Industry will be hard-pressed to resist another round of wage and fringe demands. Union leaders will use the economic boom as their chief weapon. But it need not be a one-sided battle if industry plays its cards right and maps its strategy before locking horns at the bargaining table.

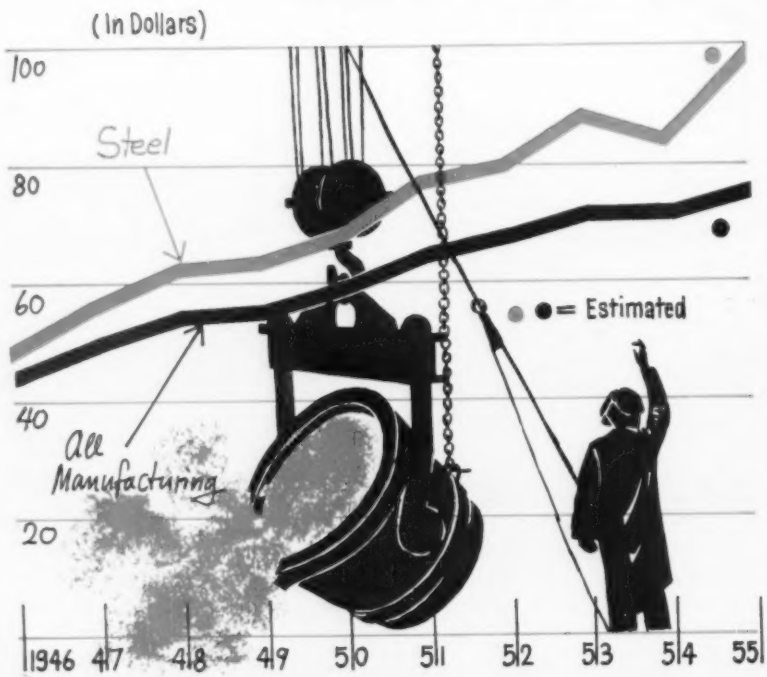
Whether the new year will be one of labor strife hinges on whether union leaders try to overreach themselves. Industry bargainers who favor industrial peace at a price still hold the upper hand. But there is a hard core of rugged individualists who feel that a management stand against further major concessions is overdue. Last year's short steel strike was an indication of the tug-of-war between opposing management philosophies. The union's ability and readiness to shut down the industry when steel demand was rising to fever pitch swung the balance toward a last-minute surrender.

Here's how labor will make its influence felt in 1956:

On the political front:

Labor is united for the first time since 1935 when John L. Lewis withdrew from the American Federation of Labor and founded the Committee for Industrial Organizations. The merged group will exert powerful political influence in this Presidential election year. When labor speaks, a lot of legislators will jump. Presidential aspirants will court labor leaders.

Weekly Earnings On The Rise



LABOR and politics: Gov. Harriman of New York with George Meany and Walter Reuther at CIO-AFL unity meeting.

On the organizing front:

Despite the great membership of the combined labor group, union leaders are concerned over the "unorganized" in industry. Total membership of the AFL and CIO is approximately 16 million, compared with a "nonagricultural" work force of 57 million. A special fund for "organizing the unorganized" is now in the making. The United Steel Workers, for instance, has its eye on the growing number of electronics experts and other specialists who operate the intricate and massive machinery in steel, aluminum, and metal fabricating plants. The USW will go after this "white collar" group to help offset members lost through "automation" and because of their key positions in plant operations.

On the economic front:

Labor will make further gains in its drive for industry-wide supplementary unemployment benefits (SUB). Vested rights in pensions also will be a big issue. The usual drive for higher wages is a foregone conclusion. Improvements in pension and social insurance benefits will be sought. The union shop will be crucial for some unions.

Short Work Week

Lurking in the background is the short work-week. Some union leaders are thinking in terms of 32½ hours, with no reduction in take-home pay. The campaign has been building up. It will gain momentum.

Part of the campaign for a shorter work-week is labor's assault on "automation." Union leaders say they are not opposed to automation, as such; only the unemployment it leads to. Management argues that in the long run use of automatic equipment in industry has created more jobs.

So long as union leaders continue to gain other major concessions from industry, the short work-week issue is likely to remain dormant. But once labor gains begin to lose momentum, it will be sought seriously, perhaps initially in the form of a demand for the 36-hour week, taking the same step-by-step course as other major labor objectives.

These are issues for management to bone up on before bargaining begins. Labor comes to the bargaining table well-armed with facts. It uses the same techniques management uses in running industry. It buys the best technical and legal brains it can find. And it backs this up with skillfully-prepared propaganda that's hard to

beat. The net result is that labor is more than a match for some industry bargainers; not because labor people are any smarter but because they're able to concentrate longer and harder on the issues to be fought out at the bargaining table.

The Ford Contract

A prime example of smart industry planning was the approach taken by Ford Motor Co. toward the so-called guaranteed wage demand of the United Auto Workers in 1955. The plan advanced by Ford and accepted by the UAW in eleventh-hour bargaining sessions was the result of two years' study by Ford labor specialists. It was not something picked out of a hat at the last minute. It turned out to be a controversial but best-under-the-circumstances solution to a gun-at-the-head situation.

While industry generally was outraged over establishment of the SUB principle, the Ford contract and others that followed are relatively limited in terms of management liability. They are not guaranteed wage plans by any stretch of the imagination. Should a period of prolonged layoffs occur, management's liability ends when the SUB fund is exhausted or seriously depleted.

In return for this and other economic concessions, Ford won the undisputed right to manage its plants. The "right to manage" clause in the Ford-UAW agreement is one of the tightest in industry. Walter Reuther thought long and hard before he picked up the tab, but he wanted SUB more than anything else. Besides, his attitude toward management prerogatives has changed since 1946 when his demand for a look at auto company books threw all industry into a state of consternation. Mr. Reuther is taking a more practical approach to labor matters these days.

Steel Labor Outlook

Nevertheless, the UAW leader accomplished what he set out to do: he established the principle of SUB. It provided the foot in the door for other unions to shoot for and broaden. Other unions will do just that.

SUB will be a bone of contention when David McDonald leads his United Steel Workers into steel industry negotiations this spring. Besides the precedent set by the auto workers, he has picked up another argument in favor of a similar concession by steel producers; he negotiated SUB agreements with two of steel's biggest customers: American and Continental can companies. Layoff benefits for employees of these companies will run 52 weeks for workers with three or more years seniority, compared with 26 weeks in the auto contracts.

McDonald's Problems

Mr. McDonald will meet with resistance from steel company management. They will point out that the situation in steel is not comparable to that in autos. And there will be other arguments advanced against applying SUB to steel workers. A strike is possible.

But Mr. McDonald has proved himself a worthy successor to the late Philip Murray, who helped found the steel union and became its first president. Besides his natural drive to get all he can for his members, the USW president has other problems: (1) insurgent groups within his own union, and (2) an antipathy toward Mr.

While Labor Unites

The Two Camps of Management

■ As Labor moves into 1956 united for the first time in over 20 years, management is split into two camps on the matter of dealing with Labor demands.

■ In the driver's seat is the management group that favors labor peace at a price. These management people are not appeasers. But they feel that a "reasonable" compromise is better than industrial strife. If pushed too far, they'll take a strike. But before drawing the line, they consider (1) cost of a strike versus a settlement, and (2) how much of the new contract cost can be passed along to the consumer.

■ The second management group is not too far removed from the first. Chief difference between the two is that the second group feels that labor negotiations in the last 10 years have been too one-sided; that Labor's contributions have not been commensurate with its gains. The extremists in this group would like to see Labor "put in its place." But they realize that only a full-blown depression would make this possible, in which case the cure would be worse than the disease.

■ The two groups occasionally unite on matters of principle. The 1949 pension strike in steel, for example. Also, the 1952 walkout over the union shop.

■ There was similar unity in '55 over Supplementary Unemployment Benefits (SUB). But Ford came up with a compromise settlement that while not sitting well with management generally, appears at second glance to have been an adroit counter to a well-timed Labor thrust.

■ But the issue of SUB is far from settled. It will come up again in '56—in steel and other industries. The auto contract set a "pattern" but other industries won't necessarily fall into line.

■ The two camps of management may well unite again and oppose compromising a "principle." If so, there will be trouble. How serious depends on how much Labor and management think the "principle" is worth.

Reuther, a feeling heartily reciprocated by the UAW leader. He's got to make a good showing to keep his job.

The issue of SUB may make steel company management more amenable to other concessions, if there's a chance to do some log-rolling. But it's doubtful that Mr. McDonald will give in. He will want to have his cake and eat it, too.

Another objective for the steel union in '56 is vested rights in pensions. This gives a worker the right to take with him any pension benefits built up while working for a particular company. Ford, for example, has agreed that a ten-year man past 40 who quits is eligible for a monthly deferred vesting benefit payable from the pension fund when he is 65.

Labor Politics

General Motors has granted the unqualified union shop to its workers. This means that after a man goes to work for GM he must become a member of the UAW. Mr. McDonald wants a similar clause for his members. At present, the new steel worker is "encouraged" by management to join the union, but he can take it or leave it.

All of which points up a fact of life in labor relations: the rivalry of union leaders, friendly or otherwise, is something for management to reckon with. What Mr. Reuther gets, Mr. McDonald wants, and vice versa. Some industry people, including some in steel, take this into account when they consider the demands of their union leaders.

Looking back, reunion of the AFL and CIO was inevitable. But it was not easily accomplished. After the initial shock of the break between the two houses of labor wore off, personal ambitions connived to defeat efforts to bring them together again. That is, until last December.

Unity In Labor

A united labor movement will continue to have problems. It won't all be sweetness and light despite the apparent harmony at last month's merger meeting. Jurisdictional disputes will have to be solved. But progress is being made.

Personal rivalries have been submerged, but far from eliminated. They will plague labor for years to come, probably will never be wiped out entirely.

Some management people are worried about Walter Reuther and whether he will be able to "take over" the merged labor movement to further his personal ambitions. There's even fear that Mr. Reuther might get a chance to mesmerize other union leaders into forming a Labor Party.

Labor Gains In '55

INDUSTRY	Wages	Fringes	Supplementary Unemployment Benefits
STEEL	11.5c plus .5c on increments = 15c Average	Reopenable on wages only	Minor progress
AUTO	Improvement factor—6.2c Inequities—1.3c Triple holiday pay	Improved: Pensions — 4.5c Vacations— .2c Insurance—1.2c	Major breakthrough — 5c.
COAL	$2 per day		
ELECTRICAL	6c (average); GE Contract: 33c over 5 yrs, plus 5-12c for skilled workers	Improved: Pensions-welfare Graduated vacation system Holiday pay	5-year contract reopenable in 3 years on SUB
OIL, GAS, CHEMICAL ATOMIC	10-15c range	Miscellaneous	

The Reuther Threat

But there's little chance that Reuther policies will prevail unless they happen to coincide with the thinking of other labor leaders on what's best for Labor in terms of political and economic aims. Reuther is up against formidable checkmates in George Meany, president of the merged labor organization, and Mr. McDonald. Messrs. Meany and McDonald laid the groundwork for labor unity over the lukewarm attitude of Mr. Reuther.

The ambitions of other powerful leaders in the new group also will tend to offset any Reuther grab for power. This will make for a lot of pulling and tugging and "marriages of convenience" that will prevent any one leader from gaining enough support to oust Mr. Meany, a shrewd politician himself, from the presidency.

Nevertheless, Mr. Reuther is an able, aggressive labor leader who is not afraid to put himself out on a limb, as in the SUB drive, if he figures he's got a good chance to win. He is as astute, perhaps more so, in the art of public relations as either Meany or McDonald. He is not averse to forcing a showdown on an important issue and has enough supporters in the merged group to make himself heard.

The conflict among top union officials will have little or no effect on the aggressive approach of individual union leaders toward bargaining with management. So don't count on individual differences to make your job any easier. That would be a mistake.

Atomic Energy Roundup

Private industry participated more widely than ever in atomic power developments last year . . . As nuclear energy entered the "hard sell" era, management became increasingly aware of its problems and potentialities . . . Here's a report on technical advances and industry's progress in 1955.

◆ MORE AND MORE alert metalworking executives will this year ask themselves: Should we move into the atomic energy field? And if it looks as though we should move in, how do we go about doing it?

The executive charged with investigating atomic energy is faced with a welter of unfamiliar words, phrases and areas. Some have undoubtedly dropped the subject for these reasons. Consider this however: Many metalworking companies—very large and very small—have done it, and some of the small ones have been quite successful.

It was only during the past year that some of the top steel companies really got down to adding nuclear engineers to their staffs. And only a few months ago General Motors found the man it wanted to head up its nuclear energy studies, found him in a big New York bank, whence he had come after serving with the Atomic Energy Commission, Washington.

Is it too late? Many might be inclined to agree with Maj. Gen. K. D. Nichols: "The best way to get established in the atomic energy business is to have started five to ten years ago." As a former General Manager of the AEC, General Nichols knows what he's talking about. But he adds that "although this is the best way it still does not keep qualified industrial concerns from breaking into the picture at this late date."

Human Energy Too—

▪ Among the top unsolved problems in the metals field which will require a lot of human energy in 1956 are those of fabricating fuel elements and of getting better and cheaper metals for reactors.

Well qualified to speak on the subject is Rear Adm. H. G. Rickover, the man who succeeded in getting an atomic submarine built in spite of the violent opposition of most of the Navy's brass. Talking to an American Society for Metals group the admiral had this to say:

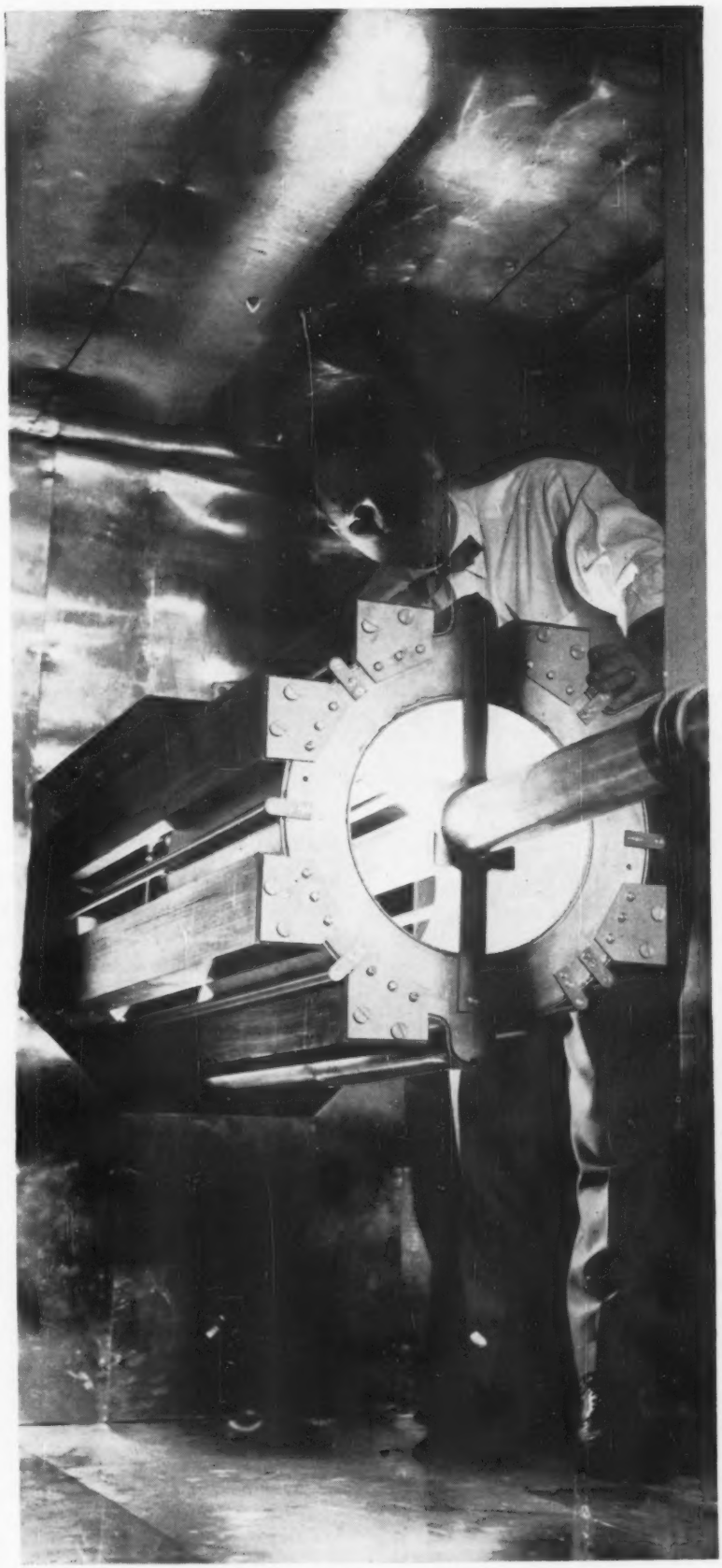
Corrosion in Aluminum . . . "Aluminum is much cheaper than zirconium and has as good nuclear characteristics. The problem is that for power reactors, the temperatures are so high that they result in excessive corrosion of presently available aluminum alloys."

Stainless Welding Problems . . . "Currently we are experiencing a series of difficulties with conventional materials. Unbonded areas have been found in stainless steel roll-bonded to carbon steel. In another case, a large carbon steel forging for a pressure vessel exhibited internal cracks; these were detected after considerable work had been done on the forging and were found to be caused by shrinkage voids. . . . Many stainless steel castings for valve bodies have been porous — in fact, it is very difficult to obtain sound castings consistently. We have become reconciled to having extra parts made in order to be certain of obtaining sufficient good ones."

Mystery of Corrosion . . . "A major problem we face in the application of nuclear power is that of corrosion. . . . The undesirable effects of corrosion are not, to be sure, unique for nuclear power, but their effects can be more serious. . . . Even a partial understanding of the mechanism of corrosion would permit a drastic reduction in the number of tests."

Reactor Fuel Elements . . . "The development of suitable reactor fuel elements is the greatest problem we face."

THE YEAR 1955 was the "year of the research reactor," said AIF. Agreements signed with nearly 30 nations will push Atoms-for-Peace but severely tax U. S. reactor production facilities and manpower. At right is business end of General Electric low-power research reactor.



But this much is obvious: If you intend to get in it had better be soon.

What decisions must you as management face this year as you explore the possibilities? First, you may want to review the charts accompanying this report, charts that estimate the growth potential of some reactor components. Then you'll want to consider the problems management must solve in this area. Here are some, as listed by General Nichols in an address to the Atomic Industrial Forum:

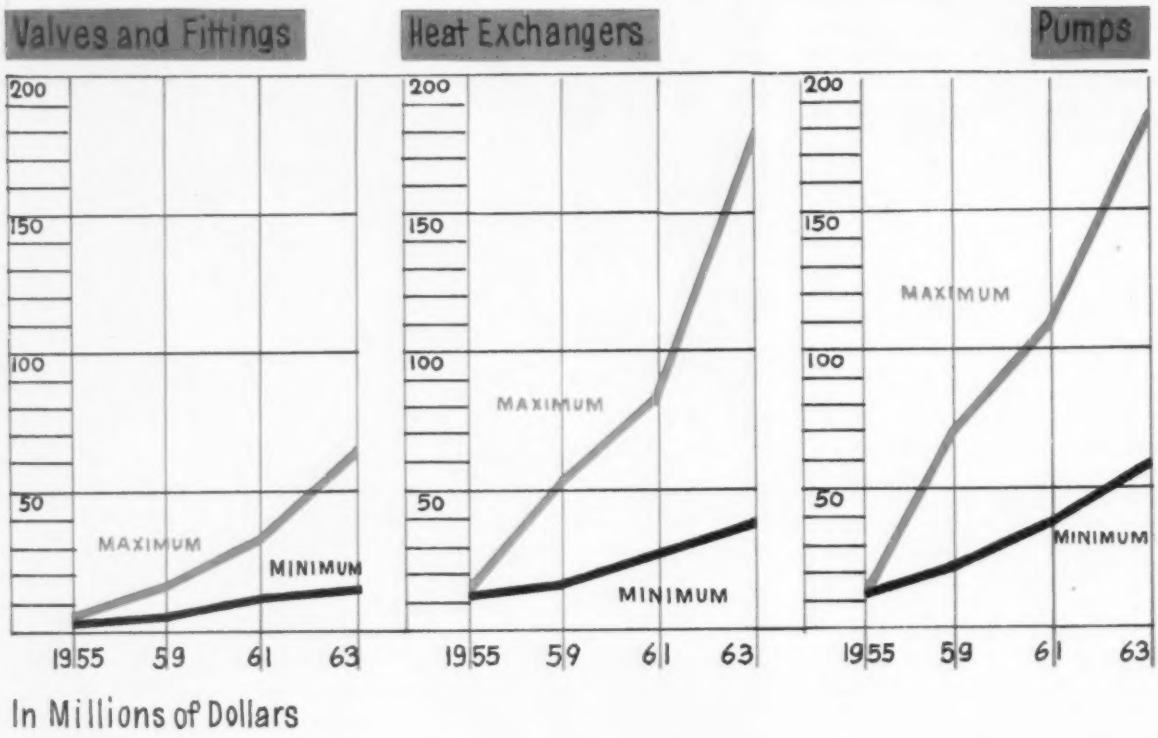
Are you interested in supplying the utilities and industry with equipment and plants for producing electric power? The components include turbines, generators, metals, materials handling equipment, boilers and all the other related apparatus. General Nichols feels that "there are bound to be some changes in the relative positions of companies supplying this field."

Are you a large user of electric power? The management appraisal problem here concerns large users of power who have located their plants in low-cost power areas. "Atomic energy may offer possibilities of moving the source of power to more desirable locations as compared to the inflexibility of available hydraulic sources or cheap coal or gas."

Can you use atomic energy in production and research? Since this radioisotope field was opened to industry nearly 10 years ago, industrial development has been broader and more active.

What about the other fellow? The problem here, as General Nichols points out, is one where top management bears about other companies investing millions of dollars

How Much Business in Reactor Components?



MAXIMUM AND MINIMUM sales estimates of three reactor components vary widely because reactor design is not yet standardized. Figures here apply only to the nuclear or heat part of the plant. Small reactors, central station units and those for propulsion of naval vessels and aircraft have been lumped together from the Atomic Industrial Forum survey (April, 1955).

in the atomic energy field. Boards of directors wonder whether or not their management is sufficiently aggressive in this field. Many are worried about whether or not energy endangers an established position. He adds that this problem has been complicated by overly optimistic statements, the difficulty of obtaining classified information, existence of a near government monopoly in the field, and the glamor and appeal of atomic energy.

But he concludes that while the management appraisal problems are difficult "it appears that those companies that are patiently and persistently building staffs and acquiring know-how are making definite progress and that the entire atomic energy field is gaining more and more momentum."

You may assign a bright young salesminded engineer with a knowledge of management's objectives and limitations to investigate the field. Or you can start by tapping brains that have already covered most of this ground by contacting one of the burgeoning number of consultants in this field. Most of these firms can draw on the experience of men who have worked for the AEC in capacities ranging up to and including that of General Manager. They can cut through enormous areas of irrelevancy to concentrate on your objectives.

Organizations like Atomic Industrial Forum, New York, maintain libraries, publish newsletters, hold seminars. In the same city the National Industrial Conference Board has amassed a wealth of material on commercial possibilities in this field, stages a huge annual meeting on many unclassified aspects of atomic energy and operates an annual school for top engineers and executives interested in its potentialities.

Even if your interest is less than intense, you may wish to send to the Superintendent of Documents, Washington 25, D. C., for "Selling to the Atomic Energy Commission," (25¢); or "A Guide for Contracting of Construction and Related Architect-Engineering Services" (15¢). From the Industrial Information Branch, Technical Information Service, AEC, Washington 25, D. C., you may secure a useful little booklet, "A Businessman Asks . . . How Can I Keep up with Atomic Energy Developments?"

Whether or not you are in the field, considering its possibilities, or merely an observer, the developments of the past year can't fail to affect your life and business.

Highlights of the atom's progress in 1955

■ The year was just 17 days old when the world's first atomic submarine, the *U.S.S. Nautilus* got under way under nuclear power. A few days later a second atomic submarine, the *U.S.S. Seawolf* was launched. President Eisenhower's "Atoms - for - Peace" ship proposal electrified the world when he launched the proposal in April though it was subsequently scuttled when the appropriation for it came before Congress.

■ In June, the British announced plans to build six nuclear reactors to produce plutonium for bombs and power for industry. This supplements an already announced 10-year $840 million program. Subsequently, at a National Industrial Conference Board meeting in New York, the chairman of Britain's Central Electricity Authority said: "By 1975 we may be generating electricity from nuclear stations at an annual rate equivalent to 40 million tons of coal. Subsequent reactor development may well reduce nuclear costs below those of conventionally fired stations."

■ Predictions like this always alarm some people who see nuclear power threatening fossil fuels. This seems unlikely — at least in the foreseeable future. K. A. Spencer, chairman of the atomic energy committee of the National Coal Assn., believes that atomic energy "is not a monster that will swallow the coal industry. It may well become a companion of coal in the development of new uses for coal." And the board chairman of Standard Oil of New Jersey, Eugene Holman, feels that atomic energy will provide the kind of energy "adaptable to large scale industrialization which, in turn, is the setting for an increased use of machines and equipment which depend for their power on oil."

■ When in July Pennsylvania Power & Light Co. announced plans to build a privately financed power station it brought the power reactor box score to seven, four partly government financed, according to AIF. They'll require some $250 million in private funds, have about 872,000 kw capacity.

■ The same month also saw atomic power sold commercially for the first time. It was surplus power produced by the *Seawolf* prototype reactor operated by General Electric at West Milton, N. Y., the third U.S. reactor to produce by-product power.

■ Biggest news event of the year in the field was the International Conference on the Peaceful Uses of Atomic Energy held at Geneva, Switzerland, in August. Representatives of American industry got a new insight into foreign markets and foreign competition; the world at large learned that it was on the verge of a new industrial revolution. The technical excellence of Soviet brains and equipment surprised many but the big shocker was a prediction on the possibilities of taming thermonuclear energy (the energy of fusion as contrasted with the fission process or splitting of the atom). It was a subject talked of before but never on so high a level.

■ Commercial developments at Geneva, as reported by consultant Gordon R. Molesworth: "Westinghouse sold a 10,000-kw package power plant to Fiat. . . . General Electric reported 15 solid prospects for small nuclear power reactors; Bendix Aviation had excellent reaction to the research reactor it demonstrated as did AMF (American Machine & Foundry) Atomics, Inc."

■ The importance of zirconium in reactor work was highlighted by AEC's August announcement that it would seek bids on 2,000,000 lb of high purity zirconium metal over a 5-yr period—or 1,200,000 lb over a 3-yr period. This is to supplement 200,000 lb. of zirconium, with 4000 lb of hafnium byproduct, now being produced annually by Carborundum Metals Co.

■ Supplementing its power reactor demonstration program, the AEC in October asked for bids on atomic power plants for rural cooperatives and foreign countries. Power is to range from 5,000 to 40,000 kw. Also in that month AEC Chairman Strauss disclosed the existence of Project Sherwood, a fusion-for-peace study initiated in 1951.

■ In November, not long after Admiral Strauss had pointed up the coming critical shortage of atomic technicians, the Soviet Union detonated an H-bomb in the megaton range. On the shortage of personnel in the field the AEC had already taken some steps to train U.S. and foreign scientists at Argonne and at other places, but proposed to speed the process by awarding technical scholarships for students who would train in the field.

■ America's commercial atomic energy industry had its "coming out party" last Fall in Washington at the first trade fair of the industry. It was sponsored by Atomic Industrial Forum, had 75 exhibitors, and was followed (in December) by a Cleveland show (150 exhibitors) under sponsorship of U.S. engineering societies.

■ From the publicity standpoint 1955 saw too much of the wrong type. Sellers of penny uranium stocks had a field day. The stocks of several old established corporations zoomed upon reports that their managements were exploring the possibilities of some phase of atomic energy. In several cases management pushed the stock back down by announcing that such optimism was unwarranted — that their work would cost a lot of money and results were uncertain. But such is the temper of the public that it may be several years before the glitter wears off and investors realize that atomic energy is not the field of the fast buck.

$'s in Isotopes

■ The annual savings in industry through use of radiosotopes have now passed the $100 million mark. There are over 1200 industrial users in the U. S. One third of this saving is accounted for by use of radioactive thickness gages and another third by radiographic testing or inspection of castings and welds. The latter category will see increased use due to introduction during the past year of two units that make such inspection faster, easier and safer.

Government Roundup

Government's attitude toward business in '56 will be conditioned by election year politics . . . Before next November, more than a dozen national issues affecting industry will get Congressional attention . . . Here's how things look now on defense spending, taxes, fast amortization, controls and stockpiling.

Politics—Independents Tip Scale

◆ It's the independent voter who will decide which party controls the White House and the Congress starting next year. Trend is away from traditional party-line voting. An increasing number of voters no longer vote their party affiliation. It's the ever-increasing bloc of independent voters that now decides the outcome of elections.

Republican candidates are sticking by their "peace and prosperity" theme—and with good reason. President Eisenhower has proved that the nation can thrive in prosperity and also remain honorably at peace. The party has its problems, however, leaders worry over slipping farm income, for one thing, and also the cries that the Administration is out to "wreck" the public power program.

Democrats are charged up with a high voltage of optimism. They confidently expect to nominate a winner at their Chicago convention in August. And the precinct workers are going all out in a drive to increase the Democrat majorities in the Senate and House. In addition, the merged AFL and CIO may spend $3 million to $4 million to elect Democrats. (They spent about $2 million for this purpose in 1954—an "off" political year.)

AFL President George Meany says frankly, "We are resolved to intensify the political activities of labor and free the trade union movement of these shackles forged by the political power of big business."

By "shackles" he says he means the Taft-Hartley law and the state right-to-work laws now in effect.

In the past, labor bosses have fallen far short of the mark in their promises to "deliver the vote." But this may not always remain true. The new AFL and CIO not only have a theoretical 15 million votes at their command, but they have an important campaign chest—a potential $1 per member, ($15 million) fund for defraying the expenses of "friendly" candidates. Whether or not the rank-and-file member will continue to vote his conscience or to vote as the unions suggest is the big unknown question in this year's election campaigns. How labor votes in November may well determine the next occupant of the White House, as well as the political color of the new Congress. From now on the political climate gets hotter.

How The Government Will Affect Your Business in '56

■ The machinery of national government is beginning to pick up election-year speed. Both political parties are firing up their campaign boilers with promises of lower taxes and better breaks for "the little feller."

As a businessman, you'll feel plenty of the hot, oily heat that political machinery gives off. Politicians of both parties are out for your vote—and the votes of your employees.

Between now and November, you can expect President Eisenhower, his Cabinet, your senators and your representatives in Congress to step pretty lively on more than a dozen national issues that bear directly upon business and industry. There'll be lots of talk—and a surprising amount of action.

Point by point, here's what you can expect in the way of huffing and puffing on business issues in the months ahead

Government— Will Let Go More Plants

◆ Decisive tests confront the Eisenhower Administration this year in the campaign to dislodge the government's hold on many business-type ventures.

There is to be no spectacular unloading of 20-odd rubber factories or a long-distance barge line this year as was the case in 1953 and 1954. Most properties now remaining to be sold are little known outside of their home states. All told, though, they are important, because their sale will represent an ebbing of the federal invasion of private enterprise.

The Defense Dept., if Congress is willing, will divest itself of nearly 50 enterprises that compete with commerce and industry. A slower start for the year is to be made by government civilian agencies.

Paint factories, cement mixing plants, cobbler shops, and miscellaneous activities the Defense Dept. seeks to close are obviously not needed for military purposes. The military is willing to drop them. Whether government ties to all will be cut depends on the attitude of Senate and House appropriations committees.

Before long-time armed forces holdings in their own areas are liquidated, the committees want to review the plans. It could be that the lawmakers will find overriding reasons why some activities should be kept open.

Even if only half the selected military enterprises are closed, the civilian agencies may find it difficult to do as well. Some have responded slowly to Budget Bureau orders to inventory their holdings and appraise the need for operating those of business type. Also tardy is the bureau's analysis of the findings. Release of much civilian-agency property may be delayed for months.

Businessmen in Gov't— Recruiting Will Get Tougher

■ Climate for businessmen serving government is going to get increasingly hostile as election time nears. The few cases of debatable improper conduct which Democratic congressional probers have been able to turn up will be used in the campaign as ammunition in an attempt to discredit the Eisenhower Administration.

Businessmen who come to Washington in 1956 are going to have to walk on eggs, practically ignore former business friends for the duration of their service.

As a result of the drive to discredit businessmen in government, the Administration is having a hard time filling top advisory jobs with competent personnel. As the year wears on, and the climate becomes more unfavorable, the recruiting task will be increasingly difficult.

But no matter who wins the election, businessmen will be invited to serve government again in 1956.

Ike's Philosophy on Business

■ President Eisenhower's philosophy on how the government should treat business and industry clearly has resulted in three years of record peacetime prosperity.

■ Here's how Ike views the role of the federal government in its relationships with business and industry:

Encourage individual initiative and enterprise.

Control drifts toward inflation and deflation.

Reckon fully with the "humanitarian impulses of our age."

Consumer Spending— Can It Hold Up?

◆ John Q. Consumer, keystone of any boom, racked up record income last year, and what's more important to the economy—he spent freely.

As the year ended, the nation hovered on the brink of a mammoth $400 billion economy, a hefty increase over any previous year in history.

Christmas business, setting new records as expected, typified the nation's spending-production-good living boom of the past 18 months. More of everything made the trip from factory to home—more toys; more appliances; more clothes; more of both luxuries and necessities.

Whether 1956 brings a continued skyrocketing economy, or an easing off, 65 million workers of all types —with white and blue collars—will look back on 1955 as the year of the spending spree. Personal income topped a $300 billion annual rate in several months, and personal consumption spending hit a $250 billion rate several times.

In the first six months of the year, personal income was running at an annual rate of $297 billion, and a good hunk of that was for goods and services which made up the difference between simple existence and good living.

Production is breaking all records for peace-time years. Employment was never higher. Profits too, are at peak levels. Sales, from all viewpoints, are clicking along at record levels.

Total U. S. population continues to expand by leaps and bounds, thereby creating new markets and larger markets for already existing products and services.

People are confident. Everyone who wants a job has one—or can get one without difficulty. Families are getting bigger. The standard four-passenger family of the 1930's and 1940's is obsolete. Trend today is toward three or four children in a family—all of whom must be fed, housed, clothed.

Spending by business and industry for new and better plant equipment is to continue at the 1955 rate of $29 billion, and maybe a bit more.

Above: BIG SCALE military spending will continue in 1956. Both parties agree to high expenditures to meet threat of Red aggression. Here is a Convair jet-propelled bomber.

Defense Spending— No Big Cuts in Sight

◆ Defense spending is to stay high —around $35 billion or more—in the 12 months ahead. Despite urgings by the congressional "economy bloc" for some sharp cut-backs, a majority of both parties in Congress is agreed with President Eisenhower that big-scale military spending is the price the United States must pay for maintaining an honorable peace.

In the coming year, the Army will spend about $8.5 billion, and the Navy will spend about $9.5 billion. The Air Force will spend at the rate of about $17 billion—nearly double the rate of the Army and Navy combined.

It's a far easier job to talk economy in military spending than to practice it. The greatest share of the three sums named above are to be paid to the government's contractors and subcontractors. As every metalworking executive knows, steel, copper, and aluminum all cost more today than they did a year ago.

These costs also figure prominently in the purchases of equipment by the Defense Department. In addition, the military is faced with added costs in the form of increased pay for the troops, fatter benefits for all personnel, a sharply juiced-up procurement program for the huge B-52 bombers (which can fly half-way around the world without refueling), more jet fighters, and some sizeable increases in purchases of guided missiles and other electronic devices often termed loosely as the equipment of "push-button" warfare.

It is highly unlikely that any big cut-backs in any of the existing procurement programs will be put into effect.

The military budget is on a high plateau for an indefinite period.

True, $35 billion a year is a lot of money for arms, but there is now widespread agreement in Washington that this sum is the price the U. S. is willing to pay for keeping its guard up, and for letting the Communists know that we are prepared to fight on land, on the sea, or in the air—and at a moment's notice.

Today, our military machine consists of fewer troops than formerly, but the rapid spread of new and complicated weapons accounts for our modern military superiority. Mechanization was a long time in winning a place in the nation's military machine, but it is here and is mushrooming in usage.

Fast moving technological developments in modern weapons has brought about the demand for highly complex components. Along with them have come more critical materials requirements and the need for highly skilled technicians. Emphasis has been switched from stockpiling heavy ordnance items to one of keeping abreast in technological research.

U.S. vs. Red Air Strength

■ How does our air defense compare with Russia's?

According to Air Force Chief of Staff Gen. Nathan F. Twining, we're still ahead — but just barely. Any let-down, and we'll be run over, to put it bluntly.

In air power, here are Key points in current Red plane strength as compared with U. S.

—

Russia has several thousand more jet fighters than the U. S. Their models compare "very favorably" with ours.

Russia has "several times more" light jet bombers than the U. S., but they are rated as inferior in performance to the latest U. S. models.

—

Russia lags behind the U. S. in medium jet bombers. We have "many times more" medium jet bombers than they. Their model, the "Badger," is similar to the U. S. B-47.

—

Russia's heavy jet bomber, the "Bison," compares "favorably" with the U. S. B-52.

Controls— In Case of Emergency, The Government Can—

◆ Since the end of the Korean War, government's emergency powers to control the economy and direct speeded up war production have ebbed and flowed, been amended, and generally resemble only slightly the authority it had during the war.

While different situations—from another "police" action to an all-out atomic war—would determine what powers government heads would use or need, they could presently draw upon the following authorizations to:

Establish priorities and allocate raw materials; production facilities; transportation; and semi-finished materials.

Use government loans, tax benefits, and loan insurance to encourage, and in some cases command, expansion of productive capacity and raw materials production.

Control hoarding, by business and consumers, and punish violators.

Order stepped up development of substitutes for scarce materials.

"Draft" businessmen, labor leaders, educators as government executives.

Suspend antitrust laws in order to get defense production. If time permitted, the Administration would go to Congress to have powers once on the books restored. These would include authority to control prices, wages, rents, manpower; to invoke rationing of civilian goods; authority to requisition and condemn property, transportation equipment, raw materials, and possibly food; authority to settle labor disputes through an anti-strike law; establish an anti-sedition law; and to control consumer and real estate credit through a renewed version of "Regulation W."

But should the situation be serious enough to demand immediate action, Administration officials, though on disputable legal ground, are prepared to assume all of the powers mentioned above until they get the time and opportunity to ask Congress for specific legal sanction. Administration officials believe that under the President's inherent emergency powers, he is empowered to take whatever actions are necessary to preserve the country.

Experience gained in the formulation and administration of controls in World War II and the Korean conflict will stand both the government and industry in good stead in the event of an all out emergency. However, working against this advantage will be the faster rate of mobilization demanded to meet the demands of an all-out atomic war.

Foreign Trade— Ease Rules Against Reds

◆ You can expect the Administration to continue relaxing the restrictions on trade with Russia and Russian-dominated countries, despite the chilly official talk between Moscow and Washington that's returned since the collapse of the Geneva peace talks last fall.

The U. S. Department of Commerce is going right ahead with plans to ease the rules applying to shipment of non-strategic goods from the U. S. to Iron Curtain countries. Just recently, a relaxation in regulations ordered by Secretary of Commerce Sinclair Weeks makes it possible to ship without the formality of a government license a long list of so-called non-strategic items, such as passenger automobiles, farm machinery, hides, and skins.

Ban on all shipments is still in effect, however, as far as Communist China and North Korea are concerned.

Talk of shipping surplus food stuffs to Red nations is under serious consideration at the White House level. We've plenty of surplus grain, cotton, butter, and cheeses, and delivery of these supplies to hungry Red serfs would be tangible evidence that the U. S. sincerely wants to help the needy. Only trouble is, nobody has yet devised a way to keep the Reds from ripping off U. S. labels from the shipments and substituting their own.

While the U. S. does not feel that gratitude be demanded from the world's needy for its aid, feeling prevails that it is only right to make sure that we and not others are getting credit for helping underprivileged nations.

FOREIGN TRADE with Russia and Iron Curtain countries will increase due to further relaxation of rules applying to shipments of nonstrategic goods. Ban on all shipments still applies to North Korea.

Urge Higher State Taxes

■ Pressure for higher state and local tax increases is being supplied by the federal government. Washington had decided to stop paying real estate taxes to local governments on federally-owned commercial and industrial property. While the payments won't stop until the end of 1959, federal officials are urging local governments to replace the lost revenue now so the impact won't be too great. The law killing these taxes passed last year, so 1956 will see the first efforts of local governments to step up other taxes.

Renegotiation— Will It Be Extended?

◆ Renegotiation of government contracts comes to a close at the end of this year unless Congress takes action to postpone the date—and it may do that. Question of extension is a toss-up. There's ample evidence on hand that renegotiation is a useless procedure, since the government already has the authority to recapture any "excessive" amounts paid to contractors. But a lot of politicians are eager to tell the folks back home they voted to "take the profits out of war," so it could go either way.

Actually, renegotiation is becoming a permanent part of the government's structure of controls over industry. It has been in effect almost continuously (it lapsed between World War II and the Korean War) for nearly 15 years.

The Renegotiation Board, which administers the law, has a backlog of more than 3,000 unsettled cases, including a few from fiscal 1951. It anticipates receipt of some 52,000 filings in the current fiscal year. Dollar value tests and experience factors used in screening will reduce the number of cases actually sent to the field for renegotiation to an expected 2,400.

The entire process, businessmen argue strongly, is autocratic and needless. They emphasize that agencies placing the orders have had years of experience in dealing with large-volume contracts. Contracting authorities have developed a number of techniques to prevent overpricing and subsequent "excessive" profits.

A compelling argument for ending renegotiation is that its target is the efficient producer. Thus the stimulus to supply goods and services to the government at the lowest practical figure is reduced. While some Renegotiation Board officials may wish to make a distinction in favor of the low-cost producer, they are restricted by the language of the act.

By late spring, the Senate-House Committee on Internal Revenue Taxation is to report to Congress on its study of renegotiation. No recommendation for prompt termination of the act is probable. The best that may be hoped for is its limitation in coverage after 1956.

Fast Amortization— There's Not Much Left

◆ You can expect a further decline this year in the government's use of fast tax amortization. Downtrend is being forced by several factors, including: (1) Completion of many of the government's expansion goals, (2) fact that business expansion is flourishing without government aid anyway, (3) Opposition to the program by some budget-conscious Administration officials.

Of some 2227 expansion goals for which fast tax amortization was once available, only 30 remain open now. Most will die automatically within a year or two. Outlook is, however, that continuing reviews of the programs and goals by government will bring additional closings this year before the automatic cut-off dates.

Office of Defense Mobilization officials say they are going to give more attention to getting expansion in the few critical goals remaining—such as components for diesel propulsion units, some castings, and some shipping equipment.

The expansion goal for the steel industry will not be reopened. ODM thinking now is that private expansion is taking care of all potential defense needs. Only shortage is in supplies for civilian demand, and the government is not going to step into that problem.

There is some slim chance that new goals will be opened, or that some of the closed goals reopened as mobilization and defense officials study possible emergency needs, but major industries, such as aluminum and steel, will probably not be included.

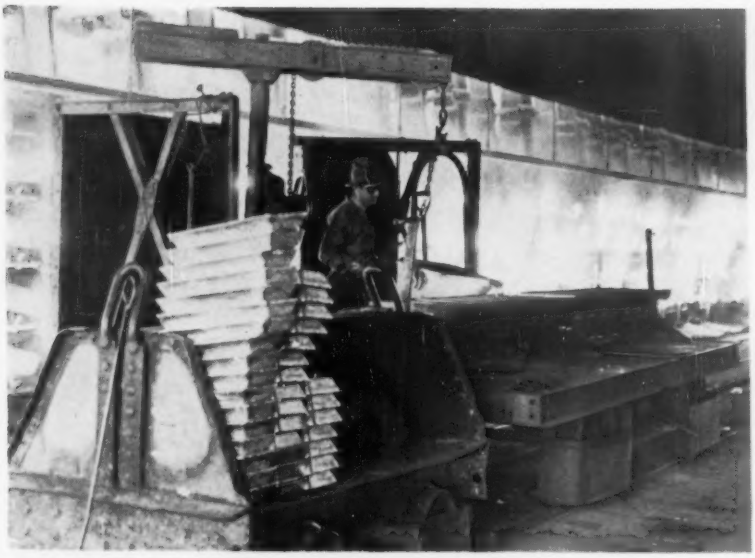
Goals Still Open

◆ In the last 12 months, the government closed 56 fast tax amortization goals, created two more, and split one into two goals. As a result, only 30 goals are still open. These include:

Capacity to Produce — aluminum forgings; aluminum sheet, and aluminum heat treating facilities; electric power; heavy aluminum aircraft forgings; heavy steel plates; alkylate; chemical grade chromite; copper; glycerin; battery and chemical grades of manganese ore; mercury; nickel; petroleum (refining); power for military, atomic energy and defense related needs; rutile; selenium; tapered aluminum sheet; titanium melting and processing facilities; welded aluminum tubing.

Products—steel castings; high voltage switchgear; medical supplies and equipment; scientific instruments; steam boilers; steam turbines; ocean going tankers; distribution transformers; oil and gas pipelines.

Several goals were scheduled to die on December 31, including the expansion program for freight cars and commercial aircraft.



GOVERNMENT will purchase $3.4 billion worth of extra amounts of materials for long-term stockpile to keep marginal industries such as lead and zinc mines operating. Here zinc slabs are poured at American Steel & Wire's Donora Works.

Taxes— How Much of a Cut?

◆ Prospects for tax cuts are very strong—more attractive to most politicians in an election year than any compulsion to balance the budget. Questions Congress will thrash out now are: How big a tax cut will individuals get; how will we go about giving it out; when will it go into effect, and which party will grab the credit.

There is little, if any chance that the corporation tax rate will be permitted to drop from its present 52 pct to 47 pct as scheduled April 1. And it's a pretty good bet that excises slated to drop at the same time will be continued at, or close to, existing levels.

There is some speculation that unless the federal budget actually is in balance by the end of the fiscal year next June 30, tax cuts in 1955 income will be blocked by Treasury Secretary Humphrey and President Eisenhower.

While tax cutters in Congress don't have the strength to override a presidential veto, it is improbable that even Ike, as popular as he is, will take a chance on vetoing a tax cut bill with a national election coming up in November.

By the time the smoke clears, it appears that the "little guy" will get a tax cut approximating $20 for each member of his family, and that the higher income brackets will get about the same reduction in tax or less.

Social Security— Changes Coming Up

◆ Election years are traditionally choice time for changes in the national social insurance system. The current year is no exception. And, for once, something is to be done for the employer.

The government's insurance experts are busy rewriting the rules for reporting social security taxes. This means that employers will have an easier time keeping their social security records. The paperwork involved is to be simplified and reduced.

Businessmen will hear some talk about an increase in the taxable wage base from the present $4200 to the first $4800 of annual earnings. But there is no strong sentiment in congress for the higher base.

Moderate extension of social security coverage is to be voted. It will apply particularly to self-employed persons.

A proposal to raise the payroll tax to 2½ pct each on the employer and employee will bring on hot debate. The existing 2 pct rate is supposed to hold through 1959.

Stockpiles— Deferments May Continue

◆ Government, with some $5.6 billion worth of critical and strategic materials in the stockpile now, will continue buying to fill its larder this year. But the list of unfilled stockpile goals is beginning to shrink.

Total stockpile to meet minimum emergency needs now consists of 75 materials and will cost $10.4 billion. In addition, under the so-called long term stockpile, the government will purchase $3.4 billion worth of extra amounts of some materials, mostly to keep marginal industries, such as the lead and zinc mines, operating.

Big question in 1956, if the current manufacturing boom continues to spin along, will be to what extent the government will continue deferring stockpile deliveries of nickel, copper and aluminum in order to help relieve shortages. Office of Defense Mobilization has already decided to forgive all stockpile deliveries in the first six months of 1956, and there is a strong hint that if the current situation remains unchanged, only a token delivery at most will be ordered in the second six months.

Government copper and nickel inventories, however, are not in as good shape as the aluminum hoard, so it is probable that the defense planners will want to add reasonably large tonnages to those stockpiles this year.

Engineers, Scientists— Shortage Demands Action

◆ Action this year is imperative if the government is to help America retain its front-running position in the slide rule and test tube race with Russia.

Throughout this decade, Russia has been putting on speed, straining to take the lead in the number of trained engineers and scientists. The U. S. shortage of men so prepared may be around 100,000 by 1959. One chilling government forecast indicates that the Reds could overtake us by 1960.

It's anticipated that the flow of engineers to waiting jobs will increase at a dangerously slow pace without support from Washington. This year, about 30,000 young engineers will be graduated. In 1957, there are to be 34,000; in 1958, 37,000; and in 1959, 41,000.

Despite the evident need for greater scientific manpower, Congress has failed to come up with tangible assistance. It's true that dozens of bills dealing with education were introduced in 1955. But this show of polite interest did not result in passage of any government-backed plan for expanded training of metallurgists or chemists or aeronautical engineers.

There is now no federal scholarship program giving aid to undergraduates in scientific studies. The National Science Foundation can assist graduate students only, and its capabilities are limited.

The force most likely to move Congress to action is President Eisenhower himself. He is informed about the scientific deficit and is aware of its danger. His suggestions for raising the nation's strength in this area will be outlined soon in specific legislation. From there on, it's up to Congress to vote his recommendations into law.

In the meantime, industry is trying to alleviate the problem through its own efforts. Many companies have started college recruitment programs.

ADMINISTRATION wants Congress to vote a 15-year program of highway construction costing federal government about $25 billion. Financing would be carried out by increasing user taxes.

Motor Vehicle Registrations

Highways—Administration Wants $25 Billion Program

◆ Big-scale roadbuilding will be voted by Congress this year. The Administration wants Congress to vote a 15-year program of highway construction that will cost the federal government around $25 billion. State governments would add to this sum 10 pct of the cost for interstate roads, and up to 50 pct of the cost of secondary roads. (State outlays for roads have risen sharply in recent years. See chart, this page).

Last year, the Democrat-controlled Congress voted down the Eisenhower Administration's pro-

posal to get going on a major road-building program by authorizing the issuance of special bonds. This method of financing would parallel that used by states for building turnpikes and bridges.

Under the new Eisenhower highway plan (to be sent to Congress soon) financing will be carried out largely through increased user taxes. This means bigger taxes on tires, tubes, gasoline, diesel fuel, trucks and buses.

This is an election year, and neither party can afford to head into the November elections without having first okayed a major roadbuilding program of some sort. The need for new roads is acute, and is getting worse all the time, due to the constantly-rising numbers of cars, trucks, and buses in service.

This time an acceptable plan for road modernization will not be stymied by a wrangle over financing methods. The lawmakers are to vote an annual outlay of $2 billion or more in federal-aid funds for several years to get the plan rolling. A sizable share of construction costs must still be borne by state and local governments.

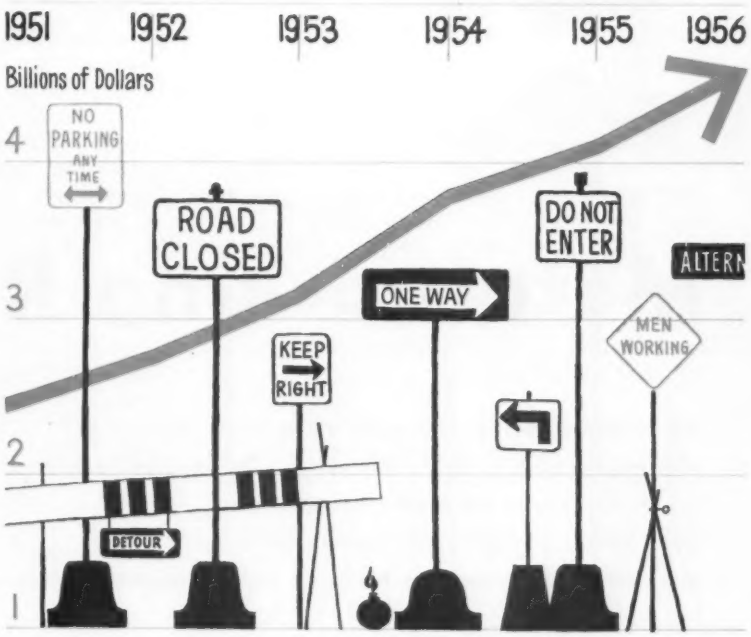
Federal money for the program will best be provided on a pay-as-you-build basis, the Eisenhower Administration has decided. It has abandoned last year's proposal for creating a separate highway corporation that would sell special long-term bonds to cover the federal part of the costs.

Instead, extra revenue from the use of highways will be sought. Net gain in the number of vehicles operating in the next 12 months is forecast at around 3 million. This increase will boost automotive excise tax returns markedly.

To make greater use of the growth, the Administration will consider asking a one-cent rise in the fuel tax. It also may explore the chances of raising the manufacturer's excise tax on trucks and motor coaches to 10 pct, matching the rate on autos.

Highway user groups will offer some opposition to higher taxes. Their protests will be tempered, however, by realization that no more equitable method of getting the money without digging into general funds is in sight.

Highway Construction Outlays



Antitrust Actions— They'll Be Stepped Up

◆ Antitrust enforcement is going to get a lot tougher as the election approaches. Both the Justice Department and the Federal Trade Commission — the latter mostly through unfair competition charges —will step up their activities.

A rash of cases, some new and some which will be held back until polling time is closer, will be filed.

Reasons: It's one way the Administration can fight back at opposition charges that it favors big business; the time is good because business is booming and competition is keen; business is continuing to grow and merge, which creates more possibilities.

Congress may also take a poke at unfair business methods by legislating tougher antitrust laws. Prime condidate for amendment is the Robinson-Patman Act, administered mostly by FTC, which is aimed at insuring fair competitive practices. FTC will come in for lots of criticism by some congressmen for laxity in its past administration of antitrust laws.

Drive is under way to discredit the parts of the report of the Attorney General's advisory committee on the antitrust laws which would provide for more practical antitrust administration. Despite assurance from legal experts that the suggestions would not hamper sound and vigorous antitrust enforcement, the campaign will undoubtedly be successful in blocking any action in the 1956 session of Congress.

Business Censorship— Secrecy Is Spreading

Government censorship restricting the free flow of non-classified information to and between industrial firms will probably get worse in 1956.

A continuing investigation by a special congressional committee won't do much to open the gates. Defense contractors are already under orders to keep operations secret if a field representative of the Defense Dept. so requests. The information involved in this directive does not have to bear an official "classified" stamp.

Metalworking Roundup

The changing pattern in metalworking is one of continued growth on a broad front . . . Automation in itself is not the cure-all for higher output and lower costs . . . Highly automated processing is being scrutinized more closely in terms of dollars-and-cents returns.

Machining

◆ A HEAVY CONCENTRATION of interest on machine tools and the latest in machining techniques was inevitable last year. Prime reason was the giant show staged in Chicago last September by member firms of the National Machine Tool Builders' Assn.

A careful study of the Show exhibits in particular, and of progress during 1955 in general, points up some broad trends in metal-cutting machine tools and processes. They will become more clearly apparent in the year ahead.

One discernible pattern is that automation, as it applies to transfer-line machining, is moving out of the ballyhoo stage. Production executives are appraising the concept more realistically in the light of hard economic facts. It hasn't always been easy to do so; much of the automation propaganda in the past two or three years has been confusing, some of it perhaps even ill-advised.

But there are definite qualifications to automation's usefulness—there always have been. First, it is not always a cure-all system to achieve faster, better and more economical machining. On the contrary, it could be financially ruinous if it were installed where something less than mass-production quantities were produced on a day in day out basis.

Still another qualification concerns the flexibility of automated transfer-lines. Thus far, most of the highly-publicized ones have been rather rigidly set up to do a series of operations on a single type of workpiece. Such a lineup, complete with tooling, control devices, work-transfer mechanisms, and gaging and inspection stations, is a costly proposition. It follows that this question now comes up quite frequently: Is the setup flexible enough to accommodate changes in end product design?

Segmented setup easy to change

One answer is already apparent. It is the "segmented" or "building block" type of installation. The idea, in theory and practice, is relatively simple: Self-contained, individually controlled, and movable machining units or stations are strung out along both sides of a transfer line. Object is to be able to change the number, type and position of these machining stations at will. Similarly, links of the work-handling system, as well as automatic gaging stations, can be added to or withdrawn from the overall setup.

This flexible type of installation is already

popular enough in the mass-production industries to have prompted a demand for more standardization. Process engineers would like to see uniform design (regardless of brand name) in the mechanical, electrical, pneumatic and hydraulic components of their transfer lines. They want new or even extra units to slip into place as easily as a radio tube.

It's not likely that standardization to this ideal degree will ever be achieved. But builders of automated lines, and their suppliers of components and accessories, will endeavor to meet customer demands for low-cost operating and maintenance efficiency.

Standard tools biggest "work horses"

Thus, as some of the flag waving about automation dies down, this production technique falls into a more proper perspective. And in its true position, considering all of metalworking, it is still dwarfed by the so-called standard, or general purpose machine tool types. The familiar lathes, drills, milling machines, grinders and other basic tools still carried the bulk of the metal industry's machining load in 1955. Moreover, the same trend will be apparent again this year.

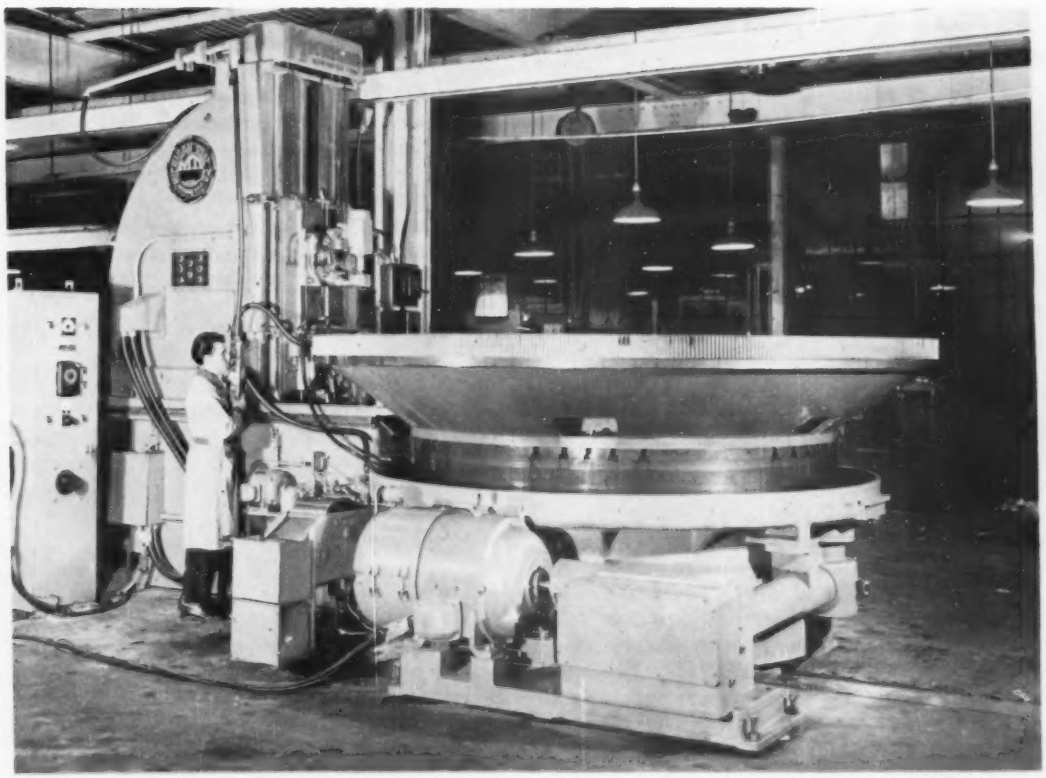
Reason for the unfailing popularity of general purpose tools is their versatility. But adaptable as they are to a variety of metalworking tasks, neither their builders nor their users are ever completely satisfied. Result is an almost continuous drive for better design. Machine improvements in 1955, as usual, were aimed in two specific directions:

(1) To make equipment capable of cutting the toughest metals with speed and accuracy.

(2) To minimize the amount of non-cutting time that must be devoted to maintenance, repair, chip removal, work handling and tool changes.

In general, the design trend in 1955 models of general-purpose tools continued the pattern of previous years. Equipment is getting bigger, heavier, faster and more powerful.

Specifically, spindle speeds are being stepped up right along, and the label "infinitely variable" on speed controls seems to have considerable appeal for more and more buyers.



ACCURACY regardless of size is required in shaving the teeth of this 180-in. diam gear.

Pointing Toward Still Faster Machining

Demand for more output per man hour.

Greater horsepower input.

Better anti-friction bearings.

Improved automatic lubrication systems.

Wider use of carbide cutting tools.

Appearance of ceramic cutting tools.

Combined tooling to save secondary operations.

More efficient coolant application.

More Accurate Machining Will Stem From

Demand for tighter tolerances on mass-produced parts.

Heavier, more rigid machine frames and beds.

Improved dynamic balancing and vibration dampening.

More accurate, wearproof ways and spindle drives.

Greater use of hydraulic and pneumatic motion-transmission components.

Better tracer control devices.

Wider use of film, tape and punched card control systems.

Self-resetting control mechanisms.

More applications of built-in gaging and inspection units.

Show visitors were impressed by drilling machines, milling machines and lathes that featured preselection of speeds and feeds. These tools automatically swing into the right speed and feed combination as the size and nature of the job changes during the complete cycle.

But the availability of almost limitless speed and feed combinations posed a problem for many machine tool users. How could they take advantage of optimum settings, especially on jobs that required them to machine unfamiliar materials, possibly with unfamiliar cutting tool grades as well?

One answer to this question appeared last year in the form of a new machinability computer. The instrument is based upon many years of machinability studies on ferrous and nonferrous metals and alloys of all types. Experience with all of the commonly used types of cutting tool materials and coolants has also been integrated into the computer design.

Cemented carbide cutting tools are an incentive behind the push toward more speed, power and rigidity in general-purpose machine tools. With power to burn in all the new equipment offered to them, machine tool users are becoming less cautious about cutting metal at super speeds.

Throwaway inserts of cemented carbide tool bits and tips are increasingly popular as a means of avoiding brazing and regrinding problems.

Latest developments in cutting tool materials are ceramic bits, also those termed "cemented oxides." They are designed to operate at cutting speeds well above the conventional carbide range. Surface finish produced with these bits is said to be superior to the degree that finish grinding can be eliminated, in some cases. Several firms are known to be well into the development stage on these new products, and at least one is expected to have its materials on the market within a few weeks.

Cutting fluids assume new importance

As machining and grinding speeds push to new highs, coolants and cutting fluids become even more important to these operations. The use of coolant in mist form seems to be increasing steadily, and should continue to do so. However, for most grinding jobs, and those involving deep-hole machining, the technique of drenching the workpiece and the cutting medium with a heavy coolant stream is still likely to be preferred.

Paralleling the trend toward higher machining speeds is an emphasis on machining accuracy. And what is even more important, machines and cutting tools must work together for repetitive accuracy. Preferably, the accuracy obtainable will depend less and less upon the skill of a machine operator.

Most tracer or contouring devices require that the stylus must actually contact the master model or pattern. But a new tracing technique which was introduced last year is certain to be followed with keen interest. It features the maintenance of a constant spark gap between the stylus and the model, and ultra-quick response by the cutting tool to the traced contour. Because there is no actual stylus-model contact, the original master part should last indefinitely.

Joining

New titanium joining techniques highlight technical progress in 1955 . . . Increased deposition rates possible with improved submerged arc welding process.

◆ MAKING PRODUCTS BETTER, faster and at lower cost are basic goals of all industry. Toward this end, welding and related processes have contributed their fair share during 1955.

But if there's any doubt as to the progress made in welding research, it can be erased by looking closely at a jet engine, rocket or nuclear-powered submarine. The welding problems involved were many, but the answers came close on the heels of new developments in metals—a sign of an industry on its toes.

Titanium may well serve as an example. Perplexities which once plagued refiners and producers soon faced metal joiners. Numerous studies were set in motion to determine the alloy structure, effects of contaminants, joining techniques and many other facets which would contribute to good joint serviceability.

Virtually every welding and brazing process has been tested and evaluated — not fully in each case, but sufficiently to lead to the development of a few weldable titanium alloys. As a result, acceptable joints are being made by established procedures with some processes.

More recently, techniques have been worked out whereby commercially-pure titanium has been welded without filler metal addition.[1] Moreover, the joints had better characteristics than when filler rod was used.

An underwater spot welding technique has also been devised by which clean titanium sheet leftovers could be stacked and joined into a small machinable billet. Tests showed that the billet material attains a tensile strength of more than 95,000 psi.

HIGH-SPEED line produces more than 1000 compressors per day. Circumferential welds more than 3 ft long are made in 23 seconds.

New principle deposits rod faster

Development in other fields progressed equally well. Deposition rates with submerged arc welding have been high, but now new techniques enable the rate of deposition to be greatly increased. The principle involves current densities ranging from 70,000 to 270,000 amp per sq in of electrode cross-section. Conventional deposition rates of 18 to 20 lb per arc hour have been boosted to 120 lb per hour and power costs have been chopped almost in half.

Adhesives and mechanical fasteners are playing a more important part in joining. New formulas, new designs have increased strength, thereby broadening their fields of application. Bonding of carbide to other metals has often been a problem because of differences in coefficients of expansion between the two. Use of a rubber-base adhesive for this purpose gives tools good shock resistance, more than adequate bonding strength and is applicable by a simple and short cycle.

Increased strength in bolts has been achieved by an unusual, if not unorthodox, method. Removal of a precise amount of material from the shank increased by several times their ability to absorb impact. Bonus factors are increased elongation, and higher resistance to fatigue failure.

Add to these developments the improvements in iron-powder electrodes, ultrasonic soldering of aluminum, inert-gas arc cutting of nonferrous metals, brazing of metals to glass and ceramics—to name only a few—makes 1955 a year which can be looked back at with a feeling of real accomplishment.

Casting

Shell molding usage extends to an estimated 400 foundries . . . Progress accelerated in new hot chamber process for magnesium diecastings . . . Advantages spur use of basic linings in cupolas . . . Improvements in nodular iron invite its use to new industries.

◆ TECHNOLOGICAL PROGRESS by the foundry industry continued during 1955. Although improvements in processing could hardly be called sensational, important changes in industry viewpoints and methods can be detected. Improvements in molding, new testing equipment and, particularly, more efficient materials handling methods have been reported. It is doubtful if any branch of the metalworking industry is changing as rapidly as the casting industry.

As expected, shell molding was a prominent topic of conversation during 1955. Considerable technological progress was made. At the present time, four of the country's largest production foundries are using the shell process. It's estimated that 400 U. S. foundries are now using shell molding.

Even more significant progress is reported in the adoption of shell cores. The use of shell cores has a number of advantages: in addition to excellent control of size and quality, handling is reduced since the cores are made and baked in the shell core equipment. Scrap losses due to handling are reduced. No processing is needed after forming the shell core. In at least one large foundry, the shell core machines are set up adjacent to the molding line.

Process undergoing shakedown

As might be expected, however, there have been some disappointments with shell molding. In some cases, the process was probably misapplied. Whether because of poor control or for other reasons, some results have fallen below expectations.

It is evident that shell molding, like every other new process, is going through a shakedown. The prediction that shell molding may be used within the next few years to produce up to 30 pct of all U. S. produced gray iron castings still seems attainable.

An interesting battle is taking place in the automobile industry between cast shell molded crankshafts and forged steel crankshafts. A major car producer changed from forged to cast cranks during the past year. Several other users of forged steel crankshafts have undertaken extensive investigations of cast crankshafts. Meanwhile, a car company which has used cast crankshafts for many years has changed to a forged crankshaft although the change is expected to be temporary rather than permanent.

Differences very narrow

It seems certain that the difference in cost and performance between cast and forged automobile crankshafts is very narrow. Each producer claims ability to produce at lower cost. The producers of both forged and cast crankshafts say they are able to meet any of the foreseen requirements of the higher compression engines that are coming. The competitive situation here looks like it will be touch-and-go for many years to come.

The possibilities of making injections in the ladle to raise total carbon has intrigued many foundrymen during the past year. Use of injection in the ladle permits economical gains such as fast melting use a low-cost metal charge fast melting final adjustment of the melt to make to the desired carbon content and graphite distribution.

Using to advantage, faster cycles, better controls and better dies, the die casting industry

FOUNDRY HANDLING is making fast progress. Here castings are being poured on conveyor line.

is pressing for a deserved large share of the metalworking market. A number of very large die castings have been produced, including some of intricate design. At least one motor car manufacturer is known to be studying a 6-cylinder die cast aluminum cylinder block. It is reported that the new die casting machines are capable of producing 30 motor blocks per hr. Advantages in tolerances and the superior machining of aluminum seem to favor Al die castings for engines. Weight saving is a further advantage. While exact figures are not available, it is reported that the cost of aluminum engines, with cylinder liners inserted, will be substantially higher than the present cast iron engines.

Magnesium die castings showed considerable activity during the past year, particularly in connection with the new, faster hot chamber process. The use of die cast magnesium parts by the automobile industry has increased. A large auto parts manufacturer has installed its own hot chamber machines. Electric motor enclosures are a comparatively recent magnesium die cast application.

The use of basic linings in cupolas is increasing steadily. Among a number of advantages of basic refractories are (1) ability to desulphurize (2) decreased loss of alloying elements such as Mn, (3) ability to produce a high carbon iron using a high steel scrap charge. The basic cupola is gaining popularity for the production of nodular iron.

Greater use of hot air blast

Progress in cupola melting has also been made possible by the controlled use of a hot air blast. Although temperatures above 600°F are seldom used commercially today, the trend is toward substantially increased hot blast temperatures. Hot blast contributes to conservation of coke and faster melting.

The use of nodular or ductile iron is also expanding. In addition to its use for automobiles and machine tools, a number of agricultural, heavy industry and electrical industry applications are opening up. Better and surer control of graphite distribution has been achieved. With additional experience in gating and risering the quality of commercially produced nodular iron has also improved.

What's Happening in the Foundry?

▪ Casting quality is continually improving. One factor contributing to this is greater use of nondestructive tests for internal soundness and strain gage checks on design.

▪ Nodular or ductile iron is finding a widening market in the agricultural, heavy industry and electrical equipment fields.

▪ Controlled use of hot air blast in cupola melting is contributing to less coke consumption, faster melting and higher metal temperatures.

▪ Shell molding is going through the shakedown stage. While there have been some setbacks, prediction that the method will account for 30 pct of all gray iron castings in a few years still stands. Significant progress is noted in the use of shell cores.

▪ The battle between shell molded and forged steel crankshafts in the automobile industry is still not decided. Both sides claim the ability to produce at lower cost.

▪ Diecasting industry is striving for a bigger cut of the metalworking market. Magnesium diecastings made considerable gains. Faster cycles, better controls and dies are being used to advantage.

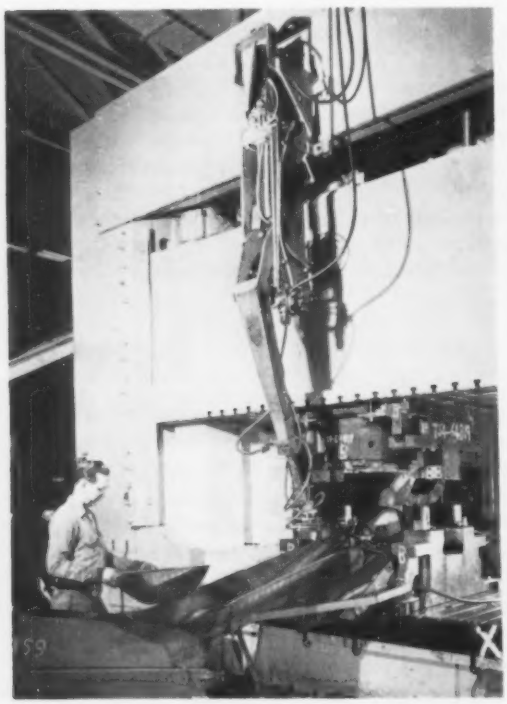
Stamping & Forming

Press development leads to higher speeds, better utilization of shop space . . . Small plants extend use of progressive dies to hold competitive position . . . Automakers closely view cold forming and begin to tool up for new applications.

◆ THE PAST YEAR has seen steady continuation of a well-established trend toward higher press speeds and the substitution of mechanical handling for manual handling of blanks and stampings. Utilization of many ingenious devices to feed blanks into presses and the use of mechanical devices to remove formed blanks has been extended considerably in large and medium size metalworking plants. This trend, already evident in both U. S. and Europe, promises to continue.

The trend toward higher press speeds is already well advanced. Press designs are being radically changed to permit shortening of the cycling time. By splitting up the heavy, movable parts of the press, greater press speeds are made possible.

Meanwhile, as a result of new press design and action, the rate at which the metal is drawn is not speeded up and may actually be slower through the critical area. The metalworking industry has learned a great deal about metal forming in recent years. There is greater understanding of precisely what takes place when flat rolled steel is drawn in a press. It now seems clear that heavy impact



UNLOADING formed blanks with Iron Hands is on the increase in both large and small plants.

DROP FORGING automotive crankshafts. Big gains were made in automatic handling last year.

should be avoided. Drawing must be started slowly but, once under way, the rate of deformation can be speeded up.

New Dynamatic clutches, new stroke adjustment features, improved handling of stock, both in and out of the press, stronger dies and presses and increased knowledge of the art have all contributed to the substantial increase in production per sq ft of floor space that has been made possible in recent years.

The use of so-called upside down drawing techniques is being extended to many press shops where this time-saving method has not previously been tried.

More uses for big presses seen

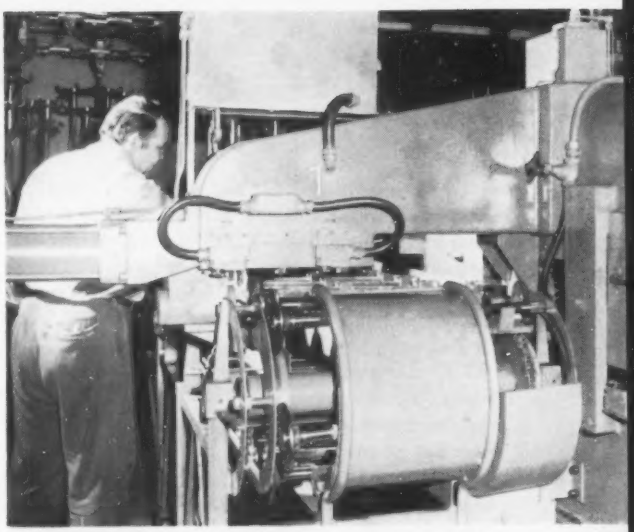
Another trend that deserves mention is the growing ability of plant managers to utilize big, new press equipment for more than one part. The so-called transfer presses, for example, are highly specialized equipment. These modern presses work from blanks rather than coils. Partially formed stampings are moved mechanically from station-to-station by steel arms. It is interesting to observe that some of these transfer presses are now being used to produce three or more different stampings with minimum downtime for tooling changes. Up to 80 pieces per min are being made on some of these transfer presses.

Progressive dies, which work from steel coils, are being used more and more by the smaller stamping shops. Increased production rates with minimum unit labor cost made possible by progressive die setups has put many smaller shops back in a competitive position.

One of the most hopeful indications of the press metal picture of today is that both the small plant and the big press shop stand to benefit through technological advancement. New, low-cost dial feeds often speed up operations. Where the small shop specializes in comparatively long run parts, progressive die tooling may be justified.

Gains in automatic handling of forged parts made during the past year have been significant. A second, large, fully-automated forging press shop (Chevrolet, Tonawanda plant) is now in operation. However, the really big gain—in the aggregate—has been the development of interesting new mechanical and hydraulic devices for handling blanks and forgings.

By eliminating unnecessary manual handling from the forging operation, a considerable gain in efficiency has been achieved. Another gain realized from these mechanical devices is their steady output all day long at the established rate. In the final analysis, the steady, unwavering output of these automations may be as important as any increase in the hourly production rate that is realized through their use.



COLD FORMING of splines and oil grooves was adopted by several auto makers in 1955.

The frequently demonstrated versatility of drop forging is a valuable advantage of this forging method. It is to be expected that where hot forming of a limited number of forged parts is called for, drop forging will continue to be popular. With new type mountings, better die design and improved maintenance, drop forge shops will continue to be strong competitors for many hot formed parts.

Induction heating of hot formed forgings

Go Slow on Full Automation?

Full automation of press lines continues to get a lot of attention. But decisions to automate 100 pct are not being made without a great deal of critical study.

Development of a "go slow" attitude on full automation is based on (1) the high volume needed to justify the cost and (2) some costly attempts at large scale automation have not lived up to expectations.

The realization seems to be growing that partial automation—the use of automatic blank feeders and unloaders—may be all the mechanization of the job that's justified—until sufficient experience is gained.

"Jumping from a simple, manually-operated press line to full automation is a very big jump" is the way one press expert puts it. Using partial automation one major auto plant is currently producing 12 different parts on one of its press lines.

is being used to an increasing extent, particularly where fast heating can be combined with mechanical handling. Fast heating, controlled atmosphere gas forging furnaces are also making important gains in the forging industry.

Elimination of unnecessary heating and controlled conservation of forging heat are typical of the steps being taken to make forging a more efficient process. The so-called hot forging machines which heat only one end of a bar, and hot upset and forge the bar without reheating are typical of the trend toward more efficient utilization of forging heat. Another example is the use of salt baths, say at 700°F, immediately after forging. This step is usually taken to eliminate the necessity for a separate tempering operation.

Automakers eye cold forming closely

A promising new die material has entered the competitive materials picture — beryllium-copper. While it is still too early to tell about this development, this new approach to better forging dies is both interesting and stimulating.

Just about everybody in the automobile industry, at least, is currently exhibiting a lively interest in cold forming. High speed cold forging machines have made spectacular gains during recent years. More recently, cold extrusion has earned, and continues to hold, the center of attention. It is no exaggeration to say that more research and development effort is being given to cold forming by the auto industry than is being given to any other single process with the possible exception of automatic assembly of parts.

Some promising results have already been achieved. During the past year several car producers began to cold roll splines and oil grooves. The method seems destined to spread rapidly. A number of additional cold forming operations are now being tooled for production. Several will undoubtedly become known within the next 12 months.

The advantages of cold forming—saving of materials, high rate of production, better physical properties—are well known. Up to the present time, a high cost tooling barrier and a lack of knowledge of the process have been the principal obstacles.

Many informed automobile sources predict a substantial number of automobile parts will soon be cold formed. These parts include piston pins, axles, and, possibly, rocker arms and connecting rods. Cold heading, cold coining and cold extrusion are the processes to watch in the years immediately ahead, according to informed Detroit sources. Cold forming in a single stroke of a well designed blank into a highly complex part demonstrates conclusively what can be done by cold extrusion while keeping production costs at competitive limits.

Presses especially designed for compacting metal powders have opened the way for economical production of a variety of parts. Presses rated up to 75 tons are now available. The use of multiple motion presses has resulted in lower tooling costs. Improved controls are also available.

Wider use of preformed forging blanks, extended use of salt baths, the introduction of many more mechanical handling devices and the growing use of cold forming are trends to watch in the forging industry.

Die Materials Are Changing

■ To meet the needs of today's bigger, more powerful presses, heavier dies are being used to absorb the constant, heavy pounding. Die designs and built-in features like knockout pins and scrap cutters are being made more foolproof.

Use of Kirksite and plastic short run dies by big volume industries continues to increase. They are frequently used in these plants to pretest difficult draw die designs. This may be one of their most important contributions.

On the other hand, a larger number of stampings for automotive use are being made on short run tooling. These include truck and bus stampings, a number produced by foreign manufacturers and a few passenger car stampings for short run models.

A minimum of 7500 pieces can now be expected from a well-designed plastic die to produce non-complicated stampings without excessive repair cost. This output can often be exceeded if advantage is taken of the ability to make fast, low-cost repairs. Also, the entire die can be replaced quickly at comparatively low cost.

Plastic checking and assembly fixtures have earned an important place in the big volume plants. But in the next few years their use is expected to be extended to many medium-sized plants and even small shops along with continued growth in large plants.

Testing

Progress reported in faster, more sensitive, more accurate testing methods . . . Higher production speeds, trend toward automation, spell out an electronic future for test instruments . . . Ultrasonic testing continues growth as portable unit appears.

◆ INDUSTRY'S MOVE toward fuller automation has been paralleled by steady improvement in techniques for testing, inspection and instrumentation. In many areas, the measures for ensuring quality control are themselves becoming increasingly automatic in operation.

There are several reasons. The promise of increased productivity through more automated handling and processing methods can not be realized without an accompanying application of faster, more accurate methods for keeping tabs on product quality. The trend, in general, has been toward wider acceptance of electronic devices, integrated, as far as is practicable, with the production process. Even where older methods remain adequate, adoption of faster, more automatic equipment frequently can lower inspection costs and speed the overall operation.

The same holds true with instrumentation for process measurement and control. Fast-changing variables and more critical processing requirements in many cases call for increased accuracy, speed and sensitivity in detecting and correcting deviations in temperature, flow, etc. This inevitably means more automatic process regulation.

Equipment checks many properties

Inspection and gaging equipment reflects the trend. Increasingly, such equipment is being incorporated into high speed machinery and automatic production lines. Besides dimensional accuracy, these inspection devices are checking hardness, compressibility, warpage, surface finish, concentricity. Most have warning or automatic machine shutdown devices, to guard against excessive off-spec production. Some evaluate the magnitude of error on faulty parts, then adjust the operation to correct this.

In continuous manufacturing operations, automatic gaging has made much headway. A fully automatic inspection unit to be placed in operation early next year is a good example. The magnetic test equipment picks up any slight variations from standard on bar stock and tubing moving along at 200 fpm, and trips a chute for rejects. It verifies chemical composition, detects flaws, and checks dimensions including wall thickness, and inside and outside diameters of tubing.

The trend toward increased use of nondestructive testing methods continued during 1955. This was furthered by cost factors, greater simplicity of preparation of parts, and time saving considerations. Nondestructive methods include ultrasonic testing, x-ray and gamma ray radiography, magnetic particle testing, dye penetrants, etc.

Billets inspected magnetically

Magnetic particle testing is being applied at one plant for detecting flaws during billet inspection. Believed one of the first applications of its kind for 100-pct inspection of steel in the billet stage, the example serves to illustrate the wider concept of inspection encompassing all steps from receipt of material through to completed fabrication of the part.[1]

Ultrasonic testing has also broadened in usefulness. In recent months, a portable ultrasonic testing unit was used for the first time to field-test welds in a 15-story building. Heretofore, interest in field welding of structural steel was limited to some extent by the problem of effectively testing such construction.[2]

Paralleling these direct developments have been the lateral approaches to the problem of effective quality control. These include the development of improved statistical techniques, and more extensive use of stress-analysis methods, to pretest how parts will behave under severe service conditions.[3]

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Materials Handling

Future of materials handling lies in maximum utilization of facilities, automation where possible . . . More compact, versatile systems are expected . . . More versatile trucks too, sturdier and capable of moving heavier loads faster, lifting them higher.

◆ ANY UP-TO-DATE analysis of materials handling must bow in the direction of automation to fully recognize the significance of recent and planned installations. In the scramble for new and better ways to maintain shaky profit margins amid ever increasing labor and material costs, manufacturers continue to eagerly investigate any automatic device that holds promise in effectively cutting handling time between raw material and finished product stages.

The search is particularly urgent in the metals field, where handling may account for 80 pct and more of the finished cost. Current estimate of Conveyor Equipment Manufacturers Association, covering a nation-wide cross-section, is that materials handling accounts for a conservative 30 pct of cost of all finished products.

Importance of cost reduction efforts is indicated by the flood of information printed last year not only on how to cut materials handling costs[1, 2], but also on improved methods of calculating those costs.[3, 4]

Tailored handling systems were the backbone of cost reduction efforts last year. This by no means implies an abnormally high rate of custom-built installations, but rather system design taking best advantage of standard or near standard machines.

Increased utilization of storage volume showed signs of becoming an area of major interest. The old concept of measuring warehouse storage in square feet is rapidly losing ground to the newer cubic content approach. In line with this thought, most lifting equipment purchased last year was sturdier, capable of elevating heavier loads at faster rates than ever before. This well-established trend undoubtedly will accelerate as warehousemen more fully realize the enormous waste volume immediately beneath warehouse rafters and girders.

Utilization of space is approaching its maximum in most production areas. A recent survey by Materials Handling Institute confirms this, and calls attention to a heightened demand last year for more and better equipment to move material faster and more efficiently between manufacturing operations. Idea among experienced production people is maintaining a constant flow of in-process components through production lines with light and medium duty conveyors, rather than cluttering valuable space with once- or twice-a-day loads.

Handling Trends In '56

1. More tailored continuous handling systems, from storage yard to shipping dock, made up of standard equipment where possible to keep costs down.

2. Look up in your warehouse. Sturdier lifting equipment will elevate heavier loads higher than ever before, making possible more efficient space utilization.

3. Expect more compact, versatile and speedier conveying equipment for manufacturing line use. Conveyor makers realize the space bind on most production floors.

4. Scrap handling systems will become more available, more standard, less costly.

Scrap handling, too, is receiving more attention than ever before. As production speeds increase through automation, better shop layout and improved planning, waste material from manufacturing processes also mounts. And scrap can take up almost as much floor space as raw material in some metal fabricating plants. Automatic balers made their appearance in several impressive installations in 1955. In one Detroit stamping plant, the integrated scrap system handles 55 tons an hour.[5]

Plan long iron ore conveyor

Long distance conveyors saw increased use in 1955. Plans for the construction of the once-fantastic 103 mile conveyor across Ohio are virtually complete. The conveyor will link East Liverpool, O. (near Pittsburgh), and Lorraine, O., on Lake Erie. It will haul iron ore one way and return with coal. Action is stalled in the Ohio legislature while problems involving eminent domain are thrashed out.

Coming a bit closer to home, materials handling engineers spoke of an increased number of in-plant installations last year linking inside storage to yard storage. One processor of steel bars and tubing has calculated costs of inside storage in his plant as 125 times higher than outside costs. Plans are under way to take greater advantage of this disproportionate figure.

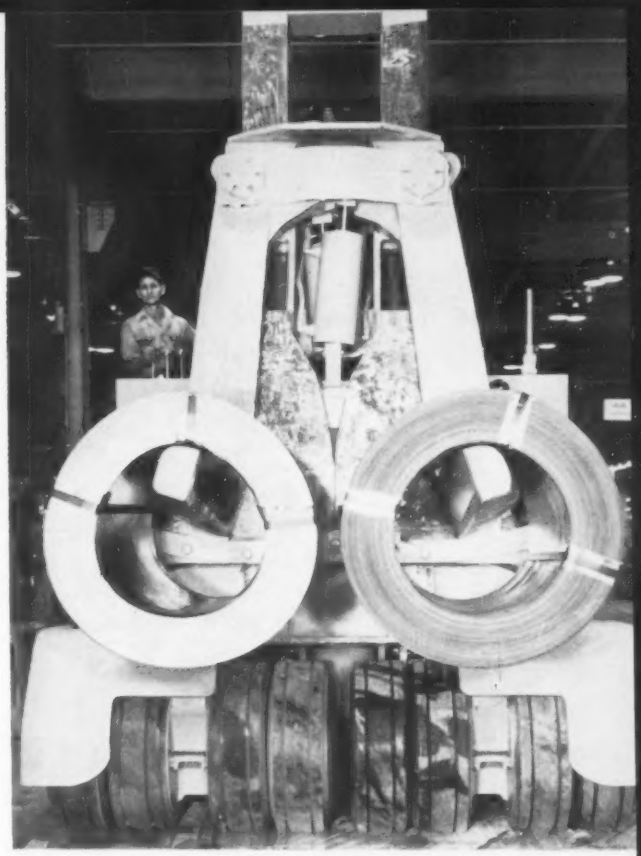
In the industrial truck field, most (if not all) manufacturers are offering some form of lease-sale arrangement to customers. Even some of the larger industrial battery manufacturers are leasing their electric truck batteries and charging equipment. Both arrangements have been well received.

Orders for materials handling equipment last year were up 20 pct over corrected 1954 figures, according to Materials Handling Institute. September 1955 bookings were 48.8 pct greater than the same month in 1954. Preliminary estimates for total 1955 bookings indicate that the year's total handling equipment business will miss 1953's high by some 10 pct.

Sales look good for '56

Conveyor equipment sales dropped moderately last year, compared with 1954 figures. Conveyor Equipment Manufacturers Association estimates the decrease was on the order of 5 pct.

Sales are expected to continue at the high average rate of late 1955 through at least the first six months of 1956. Conveyor manufacturers speak of a $150 million backlog through June 1956, and think it reasonable to look ahead to a $300 million year, one of the best ever.



RAM TRUCK lifts 80,000 lb in continuous strip mill. Fifteen-ft high, the truck handles strip 72-in. wide. Multiple tires equalize wheel loading despite rough floors.

Automation trend will accelerate this year. Manufacturers are girding themselves for the 1956 materials handling shows, and are preparing to unveil improved integrated materials handling systems emphasizing electronics, selective switching, feedback control of conveyor speeds and other advances.

Interest in the cubic space concept will heighten, and with it additional lines of more powerful and versatile lifting equipment will be made available. Speedier handling and increased rate of travel will be dominant features of most equipment introduced this year.

Hand trucks are being designed with greater loading capacity than previously, a trend that may be expected to continue.

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Metallurgy

Vacuum melting enthuses metallurgists . . . New titanium fabricating techniques stimulate broad interest . . . Forged jet alloy retains high strength above 1500°F.

◆ MANUFACTURING aspects of vacuum metallurgy set new records in terms of general interest during the past year. The volume of technical papers, special conferences and plant demonstrations have exceeded previous high water marks. And the trend is still in its infancy.

Obviously the metallurgist and his management are keeping a watchful eye on any and all pioneering developments in the new field. Principal motivation seems to be a fitful blend of scientific curiosity and fear of what the competition might have cooking. Everybody, but everybody would like to get in on "the ground floor."

German owners of the Bochumer process for vacuum degassing made definite commitments for representation in the U. S. Competing manufacturers of vacuum equipment continued to push their own "techniques," encourage new developments.

One significant new development introduced arc melting under vacuum, using consumable electrodes. Applied primarily to the melting of superalloys, the consumable electrodes are of predetermined composition.[1]

Results obtained by the process are impressive. Among them, count 1) ingots up to 2000 lb, 2) improved metal cleanliness and lower inclusion count, 3) lower gas content, and 4) freedom from segregation gained by closer control of solidification rates.

Basically, the procedure consists of making cast electrodes of an alloyed, predetermined composition from a production-size, electric furnace air melt. These electrodes are then remelted under vacuum by arc melting in a water-cooled, copper crucible.

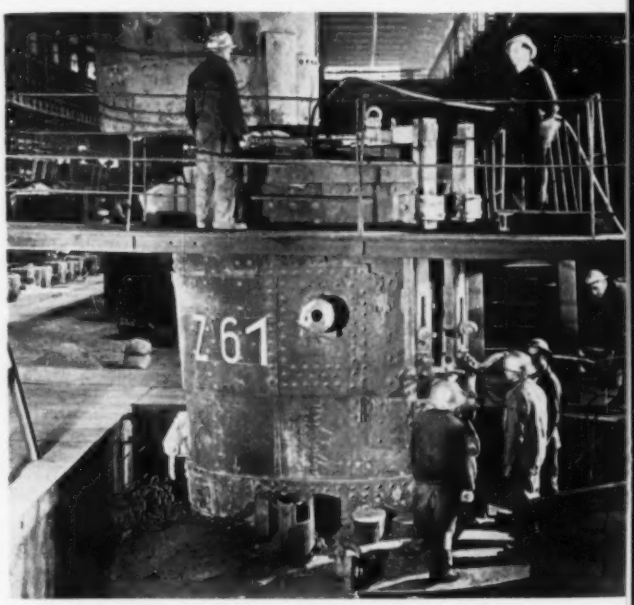
So far the process has been used to melt more than 300,000 lb of alloy. The melting of certain materials has definitely graduated from the development to the production stage. The method is promising enough to justify current plans to produce 5000 lb ingots in the very near future.

As far as degasification is concerned, results are about on a par with those obtained by induction vacuum melting. But the process claims for improved metal cleanliness are distinct since they tie in directly with the mechanics of arc melting.

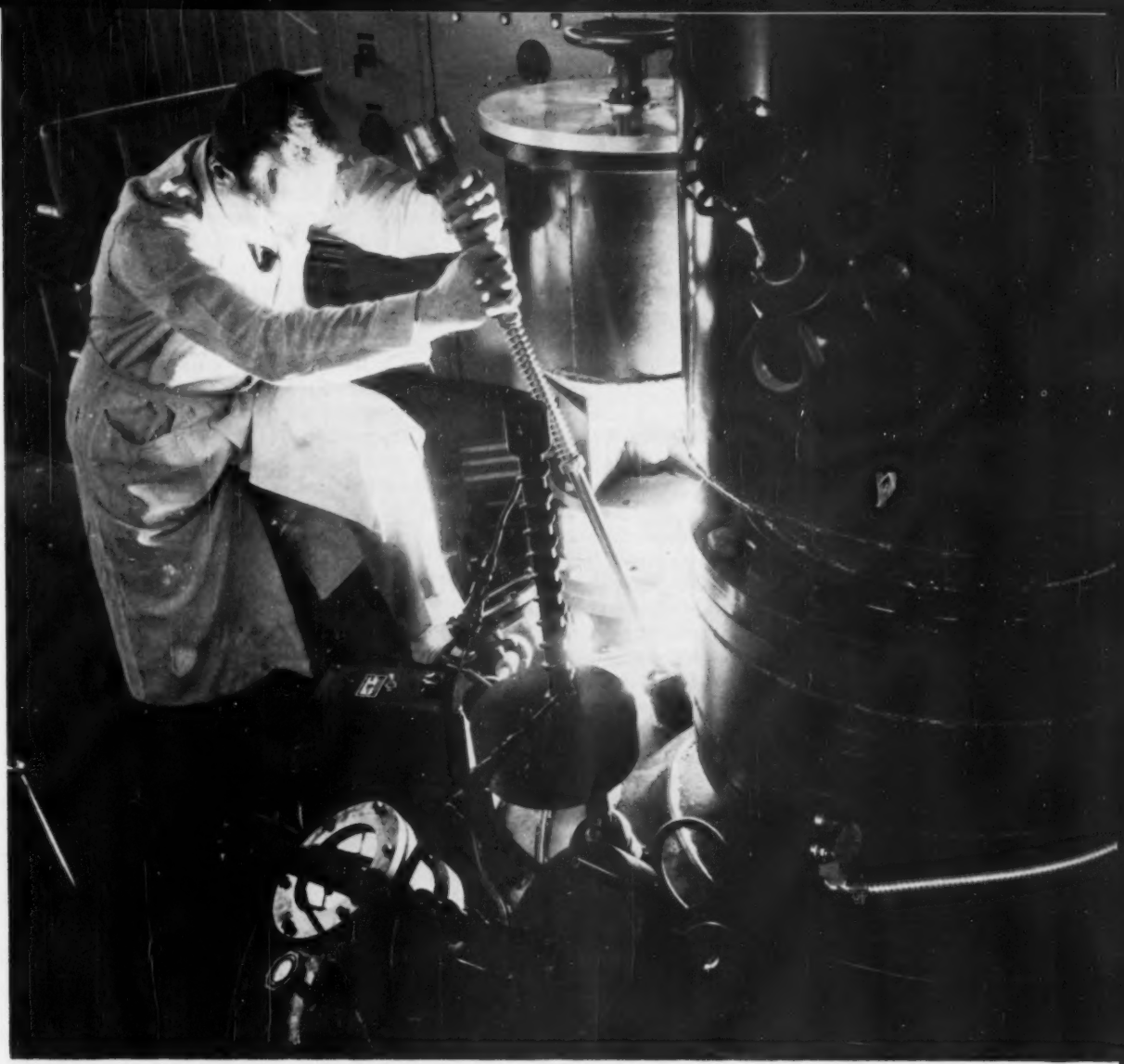
For one, arc temperatures are on the order of 8500°F. This is more than three times the temperatures normally used in induction vacuum melting.

Under the extremely high temperatures and low pressures, less stable oxides and other compounds tend to dissociate. More stable compounds, such as titanium nitrides, float to the top because their specific gravity is lower than that of the parent metal. Thus arc vacuum melting provides two important means for eliminating unwanted inclusions.

In the basic business of steelmaking, the use of super-heated, desiliconized wash metal was suggested to substantially increase present



DEGASSING 150 tons of steel for forging in plant of Bochumer Verein AG, one of the largest industrial high vacuum installations.



BRIDGE BREAKER is inserted to break crusting action in 1000-lb vacuum furnace built by Consolidated Vacuum for GE's Carboloy Dept. Temperatures range from 2800 to 3200°F.

production from openhearth furnaces[2].

The new steelmaking process is capable of melting 30-50 pct cold scrap with partially refined hot metal. It promises to increase furnace output, decrease slag volume and ore and limestone charges, and produce a low nitrogen steel.

On the basis of test results, hot metal is desiliconized with oxygen before it is charged into the stationary furnace. With a heat containing 4 pct carbon, 1 pct silicon, and 1 pct manganese, less than 60 lb of oxygen per ton of metal is required to reduce the silicon content to below 0.20 pct. At the same time, the oxygen will raise the hot metal temperature to above 2900°F.

The initial temperature of the openhearth furnace is 2750°F. Scrap must be heated above this temperature before ordinary hot metal at 2450°F, the mixing temperature, can be added to the furnace.

Wash metal at 2950°F can be added to the furnace heat earlier. Because of the higher melt-down temperature, there is an acceleration of the ordinary oxidizing, refining reactions. Partially refined wash metal tends to refine more rapidly. It also adds extra heat to the charge above the critical temperature. This results in a saving of fuel and furnace time.

The estimated increase in production rates range from a 25 pct increase with 50 pct wash metal to a 50 pct increase with 70 pct wash metal. Another advantage of the process is that it tends to make the steel plant largely independent of outside scrap sources. It is claimed that home scrap will make up more

than 80 pct of the cold scrap needed in the charge mix.

Although titanium continued to be of prime interest to aircraft producers, new fabricating techniques tended to broaden the metal's practical horizons. The extrusion process—long in use for aluminum, copper, and other metals was at last successfully applied to both unalloyed titanium and the Ti-3Mn-complex alloy.[3]

Four factors are of prime importance in achieving successful extrusion. These are extrusion temperature, die design, lubrication, and choice of die material. The optimum die angle for extruding rounds was found to be about 130 degrees.

Although a variety of die materials were carefully checked, carbide dies gave the best results, proved most efficient. The lubricant producing the most acceptable finish contained 25 pct flake graphite, 15 pct molybdenum disulphide, and 5 pct mica in a Bentone grease base.

A new super alloy, Jetalloy 1570, was introduced which appreciably widens the horizons of high temperature designers.[4] The new material is of the nickel-chromium-cobalt type and can be readily forged. It contains none of the more strategic columbium. Most important, it is capable of retaining its high strength at temperatures above 1500°F for extended periods of time.

In the pilot plant studies of the heat treatment of the new alloy, the object was to produce the best properties for aircraft gas turbine bucket operation. The effect of various heat treatments were judged on the basis of stress rupture and fatigue tests.

Solution treat before aging

Results showed that rupture strength increases slowly as the solution temperature is raised. Fatigue strength and ductility drop off markedly above 2250°F. For this reason, it is now standard practice to solution treat at 2150°F before aging.

A study of the effect of different aging treatments on rupture strength showed that the properties were much the same when aged in the range of 1300-1650°F. However, in order to meet the requirement for tensile ductility, it was found to be necessary to age at 1650°F. This treatment gave the required ductility with very little loss in strength.

Introduction of the Calmes process in the U. S. marked an important step in the manufacture of steel tube and pipe.[5] It makes available on a quantity basis a wider variety of wall thicknesses, diameters, and lengths and can be adapted to alloy and plain carbon steels.

One of the outstanding advantages of the process is that it can make use of relatively cheap raw materials to produce standard grades of seamless pipe. Also, it can profitably handle low tonnage orders without penalizing either customer or producer. This advantage stems partly from the fact that it can readily change rolls in its size mills without changing Pilger mill rolls. Mechanical alterations necessary to produce a variety of tube and pipe sizes are held to a minimum.

A highly important contribution was made to current knowledge of the effects of hydrogen embrittlement on the properties of steels.[6] It was determined that a cold-worked mild steel can be embrittled permanently through hydrogen absorption. The hot-rolled product, however, retains ductility when subjected to the same conditions.

Hardness unaffected by hydrogen

A base line of ductility versus hydrogen content was definitely established for both hot and cold worked structures. Contrary to what might be expected, hardness measurements failed to show any effect of hydrogen for either hot-rolled or cold-worked steels.

Another important research program indicated that rare earth additions can improve the transverse impact properties of 4330.[7] Even with sulphur contents less than the maximum standard SAE requirement (0.04 pct max), rare earth additions resulted in as much as 100 pct improvement in maximum transverse impact energy over a considerable temperature range.

The same program showed that rare earth additions to steels low in nitrogen (0.006 pct) had no effect, but served to counteract the adverse effects of high (0.030 pct) nitrogen.

The importance of nitrogen additions to iron-base austenitic alloys intended for service in the temperature range of 1200° to 1400°F was another new development.[8] Very high nitrogen Cr-Mn austenitic steels were prepared by means of special pressure-melting and pressure-casting techniques.

The elevated temperature properties of the base composition, 16 Cr—14 Mn—2 Mo—½ N, and several of its modifications, were found to be equivalent to those of the commercial alloy 16-25-6 in the required temperature range. Hot strength and satisfactory ductility of these alloys is attributed to the unusually high nitrogen content.

IRON AGE REFERENCES

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Metal Finishing

Improved quality control techniques typify new plating installations . . . New chromium-on-aluminum process introduced . . . Ultrasonics boost plating rates . . . Plating room waste recovery methods stir interest . . . Catalytically-cured paints promise extended coating life.

◆ RECENT YEARS have made the public automation-conscious. But platers know that automation is nothing new in their industry. It started more than half a century ago and has progressed steadily. What would amaze them would be the cumulative number of square feet of surface area plated annually. Yet, the potential is even more staggering.

One firm, in fact one machine, barrel plates as much as 10 tons of small plates per hour. Another, an elevator type machine, plates tubing assemblies for kitchen furniture at the rate of 4000 per 8-hour day and is only operating at less than 50 pct of capacity. Still another machine plates more than 4000 automobile bumpers daily, and in another plant a similar machine turns out more than twice that number. In all cases, plating quality improved.

How these machines go about their business is even more revealing than the high production rates. By presetting the cycles, these machines will produce consistently uniform finishes of exceptional quality. Only the push of a button or a turn of a dial will have each barrel, batch or rack of parts skipping by certain tanks or dwelling in others. Loads can be varied from carrier to carrier, both in the number of parts as well as the type.

Rinse control saves water

Instrumentation plays an important role in plating. One new instrument unveiled during '55 continuously measures the degree of conductivity of rinse-tank water. Once the maximum permissible concentration of chemical for good rinsing has been determined, the instrument is set for that control point. It then automatically maintains that concentration.

SPECIMENS such as this, hard-chrome plated by a new process, have withstood severe bending, twisting, punching and hammering without the coating chipping, peeling or cracking.

With it, savings in the water bill are substantial.

Another instrument measures thickness of coatings — metallic and organic — nondestructively. Practically any coating on any base can be checked quickly and accurately by simply placing a probe on the coating surface and reading the thickness directly on a calibrated scale.

The spectrograph proved valuable in one plant when other methods failed in determining causes of poor adhesion in plated deposits. Trace amounts of metallic contaminants in plating solutions were causing excessive coating failures. Use of the spectrograph proved to be the most logical approach to this perplexing problem. In fact, since the adoption of this method of analysis, not a single part has been rejected for poor adhesion resulting from impurities in the bath.

Among the new processes was one which deposits highly ductile and adherent coatings of chromium directly on cast or wrought aluminum. The coatings are hard and dense, yet have exceptional intermetallic bonding strength even under conditions of distortive bending, and torsional and impact loading. Moreover, modifications of the process have been applied to plating chromium on titanium, cold-rolled steel, zinc alloys, beryllium-copper and tungsten carbide.

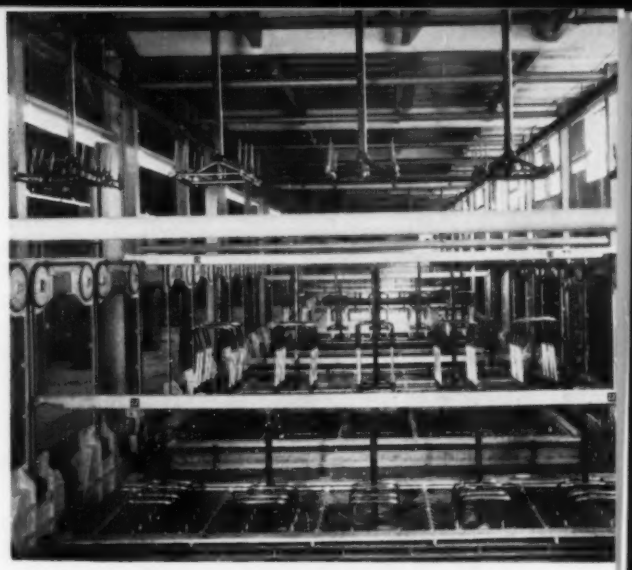
Improvements have been made in other plating processes. Two new bright nickel processes provide a higher degree of brightness, excellent leveling action, easier control and high tolerance for bath impurities.

Ultrasonics speeds plating

A new wrinkle is the use of ultrasonics in the plating bath to speed plating, in some cases as much as 30 times normal rates. Although not a cure for all plating ills, it is also reported to eliminate anode polarization, aid uniformity of deposition and reduce edge buildup. Its greatest value may lie in plating parts which cannot tolerate even slight traces of surface contaminants during plating.

Advancements in other finishing fields are equally noteworthy. Porcelain enamels, for example, can now be applied directly to a special grade of steel without the usual ground coating. Although these coatings have not attained commercial stature as yet, it's an indication of the trend in that industry. Another trend is the more extensive use of automatic processing equipment.

Improved efficiency has been achieved in the application of paints and plastisols. One of the techniques—airless paint spraying—utilizes hydraulic pressure to atomize the paint. Most of the over-spray normally encountered in conventional air spraying is eliminated. Electrostatic spraying of plastisols is also now practicable with the development of new equipment, thus making these coatings applicable to assemblies which were previously difficult or impossible to coat by other methods.



TUBULAR furniture components are chrome plated in this machine at rates of 4000 to 10,000 per shift. Despite its 140-ft length, one man can move the entire mechanism by hand.

Among other developments in the organic finishing field are the zinc-rich primers having as much as 95 pct solids content; catalytically cured paints which promise to extend pot life; latex water-base paints for industrial finishing. Also slated for the market soon is a gun for paint spraying in which the paint is heated electrically to improve painting efficiency. Heat input can be regulated to achieve proper spraying consistency and the desired finish.

Solution to the age-old problem of what to do with plating room wastes made headway on both a broad front as well as in individual plating installations. Satisfactory results have been achieved in some cases through the use of chemical recovery systems. An auto parts maker reclaims nickel salts at a cost of about 2¢ per lb, a small fraction of the market price. In another plant, an ion exchange system has been adapted to recovery of chemicals from a cyanide zinc plating operation. Although this latter installation has not been evaluated in terms of dollars-and-cents savings, it has met satisfactorily all legal requirements against stream pollution.

In addition to chemical treatment of wastes, a number of methods have been devised by which solids content can be separated efficiently from liquids.

Heat Treating

More light shed on surface decarburization in high temperature annealing . . . Surface carbon completely restored and uniform microstructure possible with neutral atmosphere, direct quenching, careful control . . . Recarburizing alloy steel still problem.

◆ CARBON RESTORATION is still a subject of leading interest to heat treaters. Although it isn't new, it isn't very old either. Perhaps that's why a lot of practical knowledge regarding its proper application is still in the development stage.

During the past year, new light was shed on the problems of scale formation and surface decarburization encountered in the production of cold drawn wire, rod, or bar stock when high temperature annealing operations are required. Republic's Union Drawn Steel Div. reported overcoming these difficulties for large scale annealing of cold drawn rod and wire by means of a pusher, tray-type, controlled atmosphere furnace.[1]

With this installation, rigid customer specifications are met with uniform microstructures. And stock with completely restored surface carbon is made available for exacting requirements.

Since about 90 pct of all production from the coil furnace is for either cold forming or automatic machining operations, only two basic furnace cycles are required. Most of the steels annealed are within the 0.35 to 0.50 pct carbon range.

Cycle I is a sub-critical anneal and produces a structure ideal for most cold forming operations. Cycle II is an over-critical anneal that produces a structure best suited for use in automatic machining operations. Both cycles produce stock that is carbon corrected at the surface. An RX gas generator provides atmosphere with an adequate carbon potential.

A guide to heat treaters interested in trying their hand at carbon restoring emphasized some of the more important control and equipment factors involved.[2] It underlined the fact that some of the limitations of carbon restoration are not generally understood. As a result, the wrong type of equipment has been purchased and the net result was highly unsatisfactory.

One definite limitation is the type of furnace that can be used. Pit-type furnaces and other types which do not provide for direct quenching or reasonably rapid cooling under atmosphere from elevated temperatures, are not generally recommended for carbon restoration. They have been used, but not without considerable difficulty.

Difficult to maintain neutrality

The importance of direct quenching at the end of the restoration cycle stems from factors inherent in the process. An atmosphere that is neutral to a particular steel is difficult to maintain over a range of temperatures.

For example, if a 1040 steel is being restored, a 0.40 pct carbon potential should be neutral to the steel at a given temperature. An increase or decrease in temperature over a period of time can affect neutrality. This would result in either carburizing or decarburizing.

At the end of the carbon restoration cycle, both the surface carbon content of the steel and the potential of the atmosphere should be

about the same. Quenching at this point prevents excess carbon pick-up or carbon drop-off. It also saves money by making an additional hardening operation unnecessary.

Restoring carbon to alloy steels should be approached with caution. Although success has been achieved with some of the more widely used alloy steels, relatively little is known about the mechanical properties of these materials after restoration. Even less is known about the effectiveness of certain alloying elements after depleted carbon has been restored.

A useful "rule-of-thumb" was developed for heat treating for the special purpose of improving machinability.[3] All users of carbon and low alloy steels know that manufacturing costs can be lowered by faster, more efficient machining. The trick, of course, is to achieve these economies without sacrificing product quality.

Evaluating machinability starts with the machine tool. The tensile strength of the material determines the force the tool must exert to separate chip from stock. The ductility of the material controls the movement of the chip.

Unfortunately, ductility and tensile strength are conflicting properties. Treatments which might decrease ductility could increase tensile strength and thus magnify this effect.

A ragged and inferior finish can result from the plastic flow of the chip before it is broken free of the stock. This can be the case when a material has rather high ductility and low tensile strength. High tensile strength and low ductility mean severe stress and wear on the tool, thus reducing tool life.

The tensile-ductility relationship is the crux of most machining problems. Some control of this relation can be gained by special heat treatments. Additions of certain alloying elements and metalloids can also provide control.

Overall coverage of induction heating equipment, placed special emphasis on the use of induction for special heat treating applications.[4] The role of induction heating in plants requiring extraordinary versatility was also discussed. Some of these pointers would apply to heat treating job shop applications as well.

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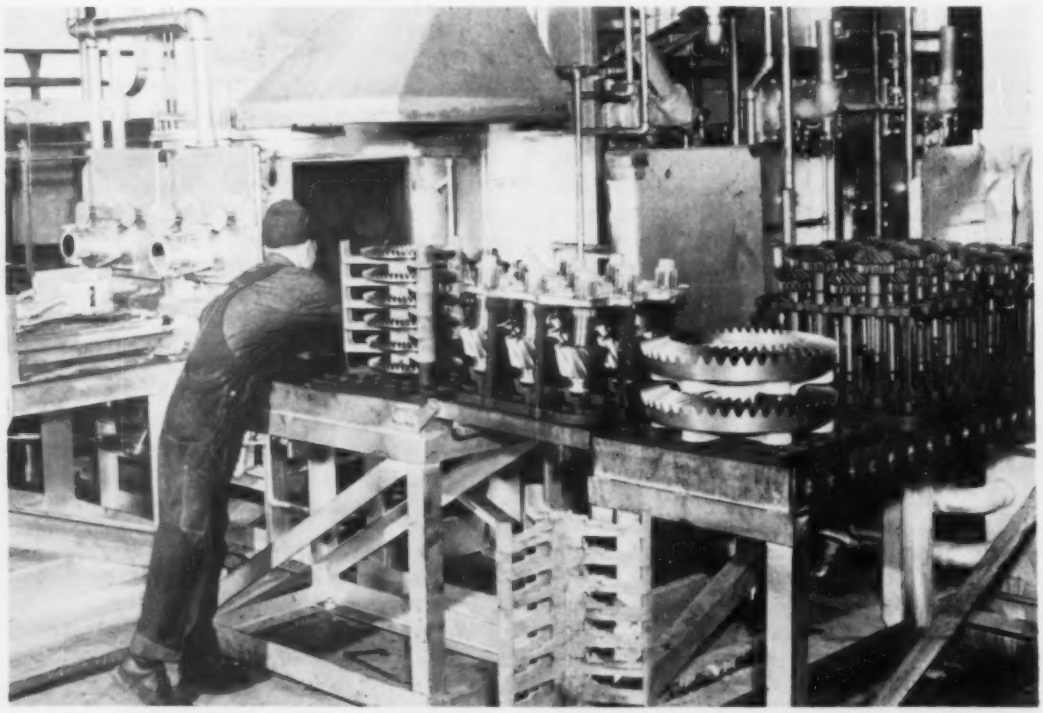

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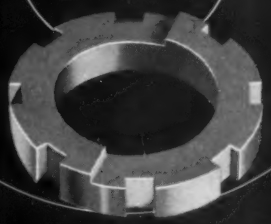

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YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

REPORT TO MANAGEMENT

Don't Take It for Granted

Never before have you entered a year on a wave of optimism like that you are experiencing at the start of 1956. The "best ever" 1955 is giving way to "as good or better" 1956 in the midst of one of history's greatest economic booms.

There is no reason to doubt any of it. With earnings, both individual and corporate, climbing to new highs, a record employment bringing home record income, and business planning a new phase of expansion, there is no reason to have misgivings.

The only thing these optimistic reports and predictions don't guarantee is that you will get your share of all the good business. The market potential is there, but it's up to you to take care of your own end of it. Business isn't going to come your way automatically. You still have to go after it.

Competition Will Be Stiff

A competitive market does not mean a weak market. That has been proven time and time again by the auto and appliance industries which chalk up their biggest sales years in periods of stiff competition.

In only a few basic industries are the markets for everybody assured. And even in these, producers can not afford to get careless about their customers.

Particularly in heavy goods industries, sales will be high, increasing in some cases. But industry competition will be tough. Even where demand for the moment exceeds supply, it's wise to remember that times change and the shoe may again be on the other foot.

The Signs Are Good

There is plenty of evidence in already to prove that industry and business are not resting on their laurels, that alert businessmen are planning ahead, not sitting back to reap the harvest of a good potential market.

Behind the new planning for expansion and improvements is the knowledge that quality must be improved in competitive markets. Price must be kept down as much as possible within limits of adequate profits. In many cases production capacity must be expanded, new products developed, engineering and research enlarged.

Unless your company is in step, results can be serious. All the market potential in the world won't help if you can't compete in terms of product quality and cost, customer relations, and delivery. In the midst of plenty, it is possible to lose ground. Progress is relative and you can stand still by not moving forward fast enough.

A Year of Decision

1956 can be a year in which you profit tremendously. But it is also a year in which you may either improve your position in your field or lose ground to those who do.

It is a time to take a bearing and determine if your company is on the right course. Ask yourself typical questions like these: Is your present location the best for your future markets? Are your suppliers happy or at least reasonably sure that you are doing your best for them? Are you planning new methods and probing new markets?

Are you anticipating labor's demands correctly and making adequate preparation for any bargaining that will occur? Unless you are one of those protected by a long term contract, you will probably face negotiations or demands from your union this year.

Too often business won't study the records of previous negotiations in related fields. It can be very expensive not to keep yourself informed about your union's goals, what precedents have been established, what to expect and what you can grant. You should have a good idea of where you can yield, where you should stand firm.

INDUSTRIAL BRIEFS

Dispersal Needed . . . Five atomic bombs could destroy 60 pct of the nation's electronic instruments capacity, according to Dr. Robert Janes, assistant manager, propulsion and structural research dept., Armour Research Foundation of Illinois Institute of Technology, Chicago.

Sales Hazard . . . W. J. Savage Co., Knoxville, Tenn., has been named distributor in Eastern Tennessee for products of the Hazard Wire Rope Div., American Chain & Cable Co., Inc., Bridgeport, Conn.

Sage Brush Mission . . . The U. S. Air Force's new C-123 assault transports flew their first tactical mission in Exercise Sage Brush near Fort Polk, La., air-evacuating Army "casualties" from various front-line airstrips in the maneuver area.

Canadian Meters . . . Rockwell Manufacturing Co. of Canada, Ltd., has begun production of its meter products in Canada for the first time, at its Guelph, Ontario, plant; and has opened a new sales office in Toronto.

Business School . . . International Business Machines Corp. will open a new school in San Jose, Calif., for training customer engineers; members of the company's service force responsible for the installation and maintenance of IBM equipment. Classes are scheduled to begin on January 5.

Liability . . . A research project covering problems of public liability in the atomic energy field has been placed with Columbia University, by the Atomic Industrial Forum, Inc., which, together with other components of business, is sponsoring the study.

Silent Money . . . Koppers Co., Inc., Pittsburgh, Pa., will acquire all assets of Industrial Sound Control, Inc., Hartford, Conn., manufacturer of noise control equipment. Transaction is on a cash basis, with no amount disclosed.

Good Business Insurance . . . Four Lane-Wells fellowships have been awarded by Dresser Industries to petroleum engineering students, selected by the schools themselves on the basis of scholastic achievement and character. Winners are Johnny A. Spannagel, Texas A & M; James C. Savage, California Institute of Technology; David A. Rowland, University of Texas; and Naim Rafidi, University of Oklahoma.

Date in Dayton . . . Reliance Electric & Engineering Co., Cleveland, manufacturers of electric drive equipment, has opened a new sales office in Dayton, Ohio.

Process Import . . . A German-developed process for producing refined benzene, toluene, and xylene from light oil is available from Koppers Co., Inc., Pittsburgh, Pa.

Hero . . . James Auld, a roller at Republic Steel Corp., Canton, O., was awarded the President's Medal of the National Safety Council, for saving a two-year-old boy from drowning.

Flint Testing . . . The George L. Nankervis Co., Detroit, manufacturers of testing equipment for automotive and aircraft industries, has opened a sales office in Flint, Mich.

New Name . . . The Lennox Furnace Co., Marshalltown, Ia., has changed its name to Lennox Industries Inc., to reflect the current diversity of production.

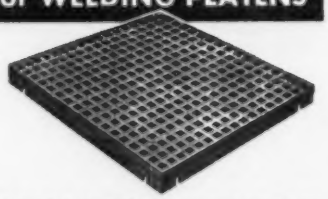
More Hospital Beds . . . Hard Manufacturing Co., Buffalo, manufacturer of metal furniture for hospitals and other institutions, is undergoing a $100,000 expansion and modernization program.

Bigger Plates . . . Joseph T. Ryerson & Son, Inc., steel distributor, announced that it is now stacking stainless steel plates up to 105 inches wide in thicknesses from 3/16 inch to 1 inch. Types available are 304, 304-1, 316, and 316-L.

U. N. Report . . . "Proceedings of the International Conference on the Peaceful Uses of Atomic Energy" is the name of a 16-volume report on the status of world nuclear power published by the United Nations.

Pending Approval . . . Rheem Manufacturing Co., major producer of automatic storage water heaters, will merge with Richmond Radiator Co., plumbing fixtures manufacturer, if stockholders of both companies approve. Transaction calls for exchange of four common shares of Richmond Radiator stock for one of Rheem.

BENDING BLOCKS or WELDING PLATENS



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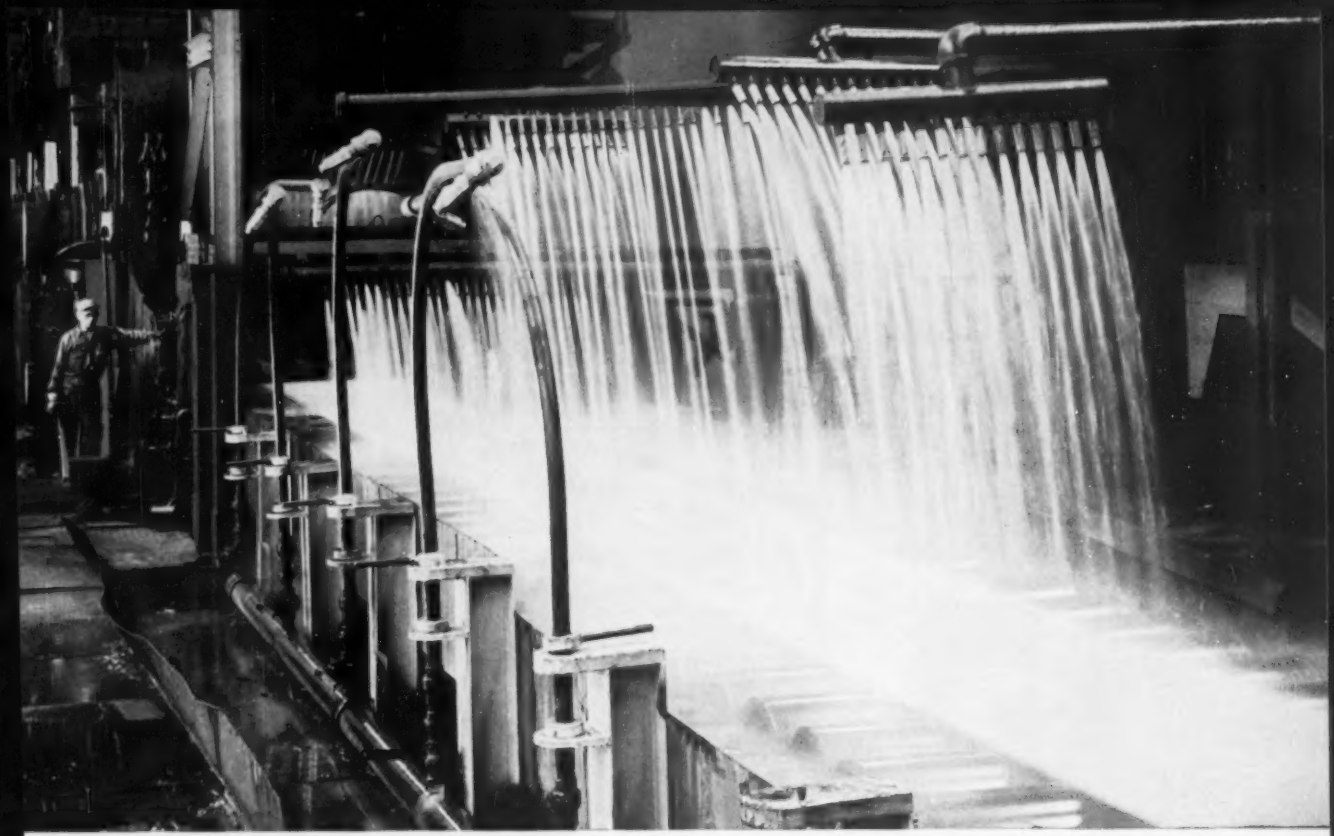
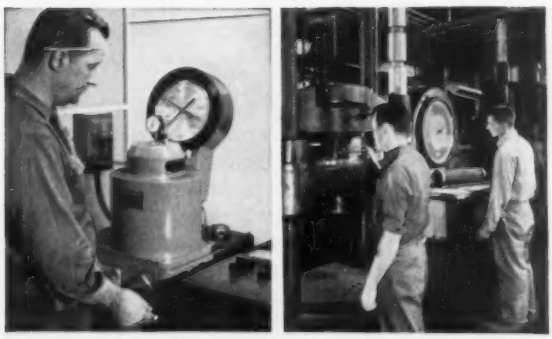
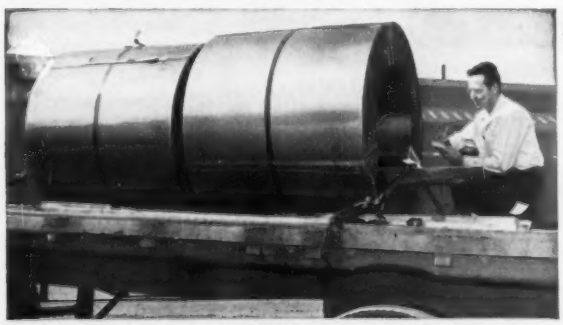


How Great Lakes Steel *sprays* for quality



Left: The Olson Ductility Test is performed in one of the metallurgic laboratories. *Right:* A tensile test is made at the Quality Control Department's main lab. These are two of many checks to assure correct grain and hardness.



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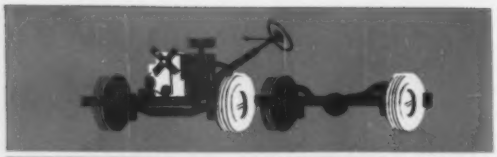


AUTOMOTIVE ASSEMBLY LINE

For 1956—Competitive but Confident

Auto industry looks back on '55 as its greatest . . . Comparatively slow market for 1956 has pessimists worried . . . Big changes are ahead for 1957 models, due to appear in early fall—By T. L. Carry.

◆ IF ONE WORD describes the auto industry in 1955, it's the term, "biggest." No matter what phase of the industry, 1955 is the biggest for production, changes, labor agreements, sales and profits.

But to some observers close to the scene, 1955 goes down as the year of the big surprise.

Nobody, including the consistently accurate Harlow H. Curtice, president of General Motors Corp., was able to predict the tremendous proportions of the 1955 market. Producers weren't exactly caught with their plans down, but in some cases, particularly steel, it was a strain to reach the goal of 8 million cars and 1¼ million trucks.

What Happened . . . Looking backwards, company executives are still asking themselves how it happened. As usual, they have come up with all kinds of answers.

The 1955 models whetted the public's appetite for cars. Most of the models introduced were brand new from top to bottom. In addition, the basic economy of the country was, and still is, very healthy. People had more money to spend for durable goods and were willing to go out on a limb from a credit standpoint to buy cars.

This in turn had its effect on new car dealers. Some were placed in rather uncomfortable competitive positions. The results were big discounts, giveaways and advertising gimmicks. At the same time, the number of crazy credit deals increased. The policy of no money down with 36 months to pay in many cases became the rule rather than the exception.

Long Term Effects . . . The effects of 1955 are going to be felt in the industry for many years to come.

The supplemental unemployment benefit (SUB) plan adopted by the auto companies is one case in point. The principle has already been carried over into other industries but the big push for a larger and better SUB plan is likely to come next June when bargaining begins for new steel contracts.

One other result of 1955 which is already being felt is the tremendous amount of money being spent for expansion in the industry. The capital improvements are not limited to the automakers. Steel producers are also expanding their facilities in order to meet a growing demand.

New Yardsticks . . . Perhaps the biggest effect of the whole year was the change in auto executives' thinking. Everyone concerned is faced with the realization that the car market has broadened much more and much faster than expected.

The old yardsticks for measuring the industry have been thrown away and new standards have been set. Making and selling automobiles is no longer the seasonal occupation it used to be.

The time has passed when 35 pct of a company's production was sold in 3 months. Sales have levelled off on a new and much higher plateau.

The industry is entering the new year with this basic change in its philosophy. The question in everyone's mind is whether the record breaking pace can be maintained.

Down 10 Pct . . . Executives talk loudly of doing even better this year than they did in 1955, but quietly admit that business might be a little softer—perhaps 10 pct less.

A 10 pct reduction would make 1956 the second biggest year for the automakers. Also keep in mind that election years have a peculiar way of being very good for business.

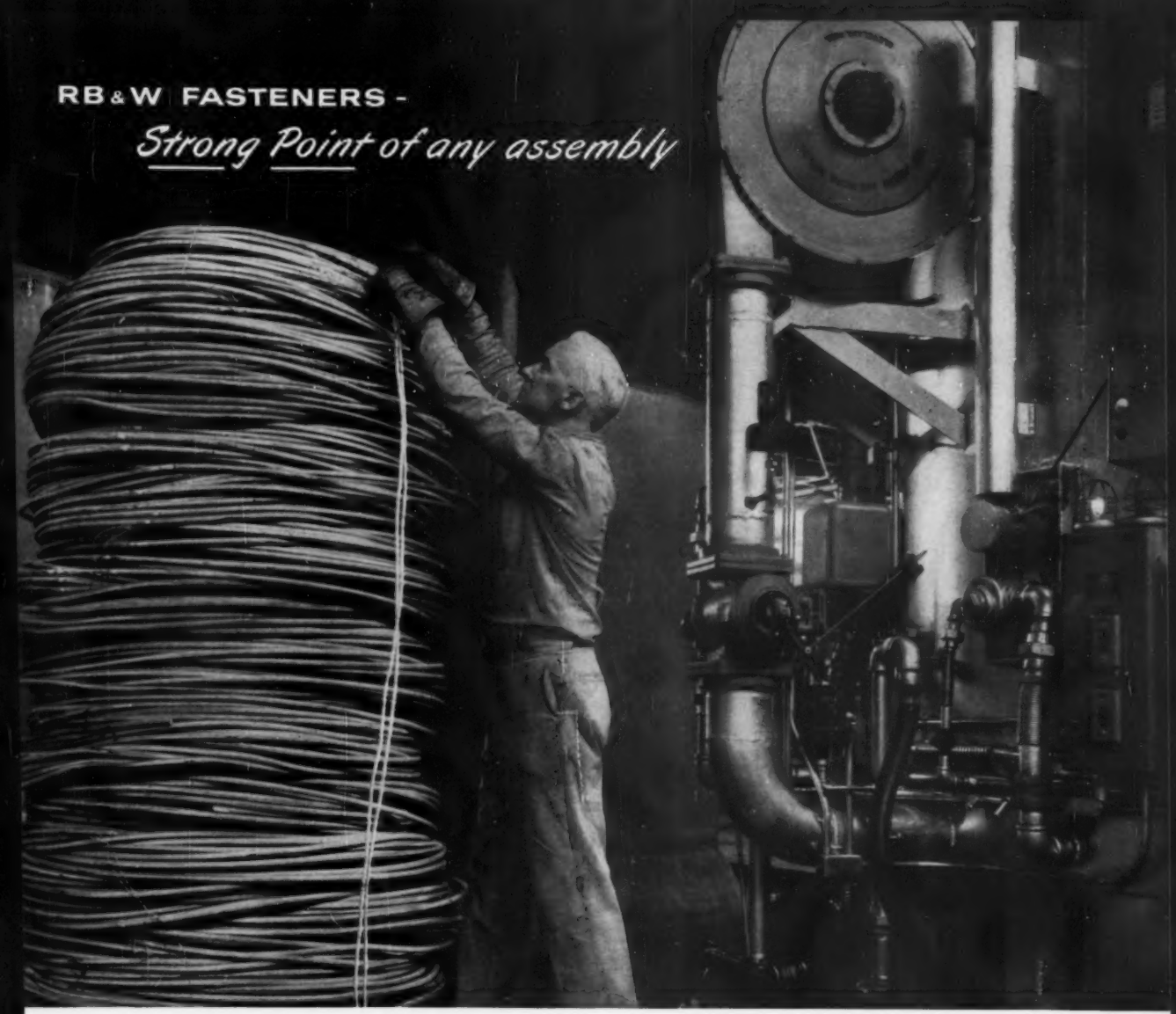
One thing, however, is certain.

There'll Be Some Changes Made in 1956

DEVELOPMENTS	RESULTS
Fuel injection system	Lower hood and longer, lower look.
Smaller wheels	New concepts in braking.
Air suspension system	Smoother ride, more comfort.
More horsepower	More speed, greater maneuverability.
New transmissions	Greater driving ease.

RB&W FASTENERS -

Strong Point of any assembly



Where the heat's on to lift bolts and nuts out of the ordinary

You won't see these spheroidizing furnaces in many bolt and nut plants. They call for a big investment of money. But to a company that wants to be sure of conditioning metal for the best bolt and nut possible, they're worth it.

In the photo above, you see R. M. Hubley setting up to anneal coils of wire rod to change its structure for the better. Next, he'll hoist the furnace at right, setting it down over the stacked coils. This special equipment makes it possible to accurately control the heating, cooling and the atmospheric conditions inside the housing.

Working with the most modern and complete facilities, RB&W men can bring to bear the full extent of their experience. And experienced they are . . . most have long years of service in the company. Some have followed their fathers' and even grandfathers' footsteps.

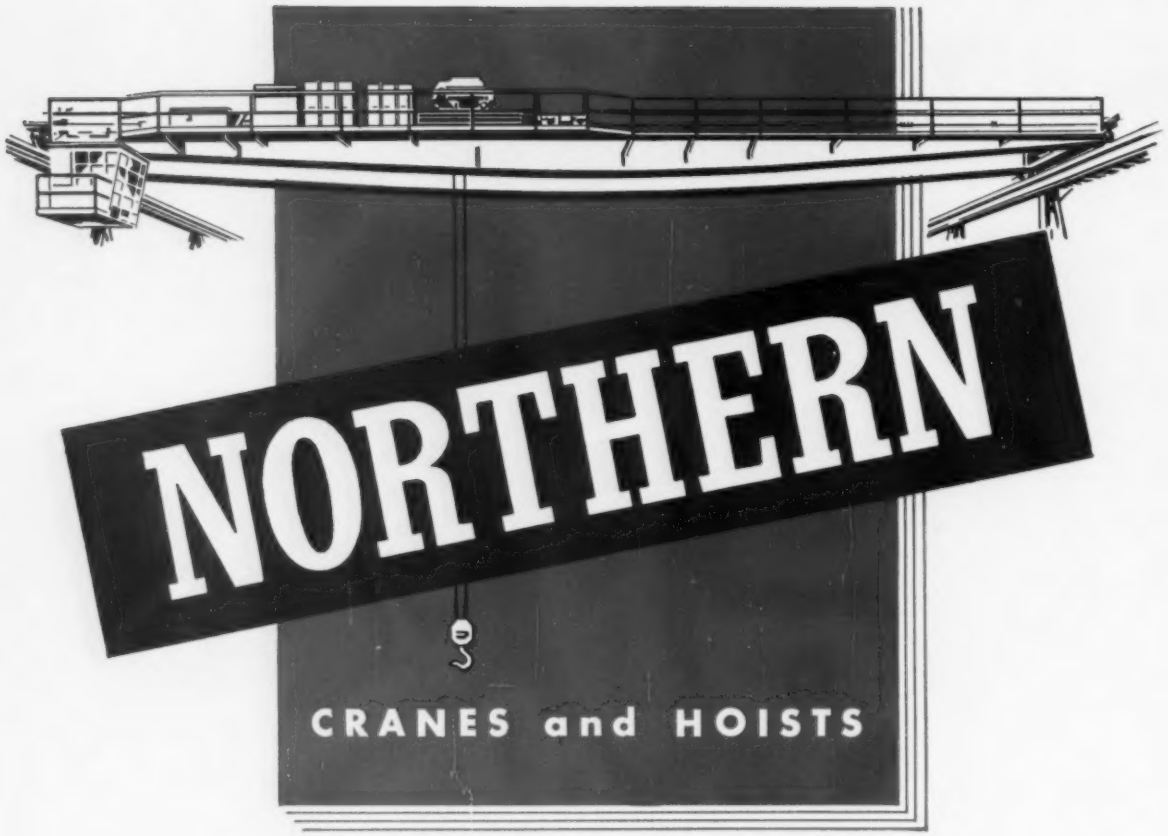
It's this combination of equipment, experience and quality control throughout RB&W plants that assures you more quality for your money . . . a reliable source of supply . . . and strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W

110th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.



Look Overhead...
See "NORTHERN"

"NORTHERN" — the name you see on overhead electric cranes in industrial plants of all kinds wherever you may be, because NORTHERN — since 1899 — has been a leader in industrial crane design and construction.

The name "NORTHERN" represents faithful adherence to uncompromising design, quality controlled machining, and closely inspected fabrication. "NORTHERN" Cranes and Hoists have an extra margin of safety — give dependable, fast service under the most rugged, emergency conditions — are notable for fine, standard-type electrical equipment and controls for precise manipulation and quick, easy maintenance with minimum downtime.

Let us send you Crane Bulletin SE-108-A, Hoist Bulletin H-112

NORTHERN ENGINEERING WORKS

210 CHENE STREET, DETROIT 7, MICHIGAN

•

OVER 50 YEARS BUILDERS OF MATERIAL HANDLING EQUIPMENT

The market is going to be glutted with cars. This year might not be the most productive but it is going to be the most competitive. The scramble for the car buyer's dollar will make 1955 look like an old maid's tea party by comparison.

The crazy dealer ads and even crazier credit terms will continue to increase.

Dealer Pressure . . . But at the same time, recent Senate hearings involving GM may take the heat off dealers. Although the hearings apparently did not uncover any cause for action, there is evidence that automakers will be reluctant to put pressure on dealers to take more cars than they can sell at a profit. How far this will be carried and what its effect will be is one of 1956's unanswered questions.

The competition could in turn lead to an even earlier introduction of 1957 models to offset lagging production and sales.

In the meantime, work on new engineering developments is continuing and some of the biggest changes in history are coming up in the very near future.

One of these is a fuel injection system which will probably be introduced on some of the more expensive 1957 cars.

Lower Look Ahead . . . Use of the system will allow stylists to lower hoods as much as 6 in., making it possible to completely change the appearance of the car and give it a much longer and lower look. In addition, wheel diameters are going to be reduced and there will be a pronounced trend toward a much more extensive use of glass.

An air suspension system, which will replace the conventional coil and leaf springs, is also in the offing. Already in use on some buses, the passenger car version has been refined to give an even better ride.

The smaller wheels are also going to call for a big change in brakes.

More Automation . . . Engineering developments will not be confined to cars alone but will also be seen in the actual production and assembly of automobiles.

Present expansion plans call for installation of greatly improved production and mechanical handling methods. Automation is becoming more and more pronounced and, despite varying opinions on the subject, it is not only here to stay but destined to grow bigger and better.

The changes are going to be felt in the metalworking industry. This is how it is shaping up.

Steel . . . Automakers will be building up some kind of inventory which they have not been able to do. Also, production cutbacks are not going to be tremendous. This will keep the demand relatively high.

Aluminum . . . The use of light metal in cars will increase next year. Engineers are not primarily concerned with substituting aluminum for steel but they have found that it serves the purpose in some problems of design and styling. The trend toward lighter cars and bigger engines will be felt here through light metal use.

AUTOMOTIVE NEWS

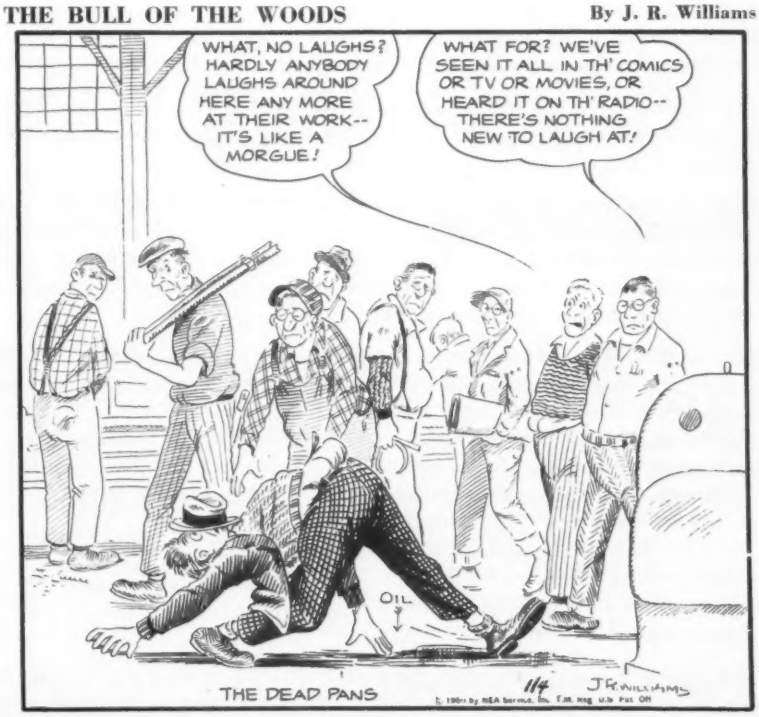
Nickel . . . No immediate relief is in sight from the gray market. Small platers will continue to feel the pinch more than larger companies and premium prices will continue to be paid. Aluminum will be substituted on cars where it is possible.

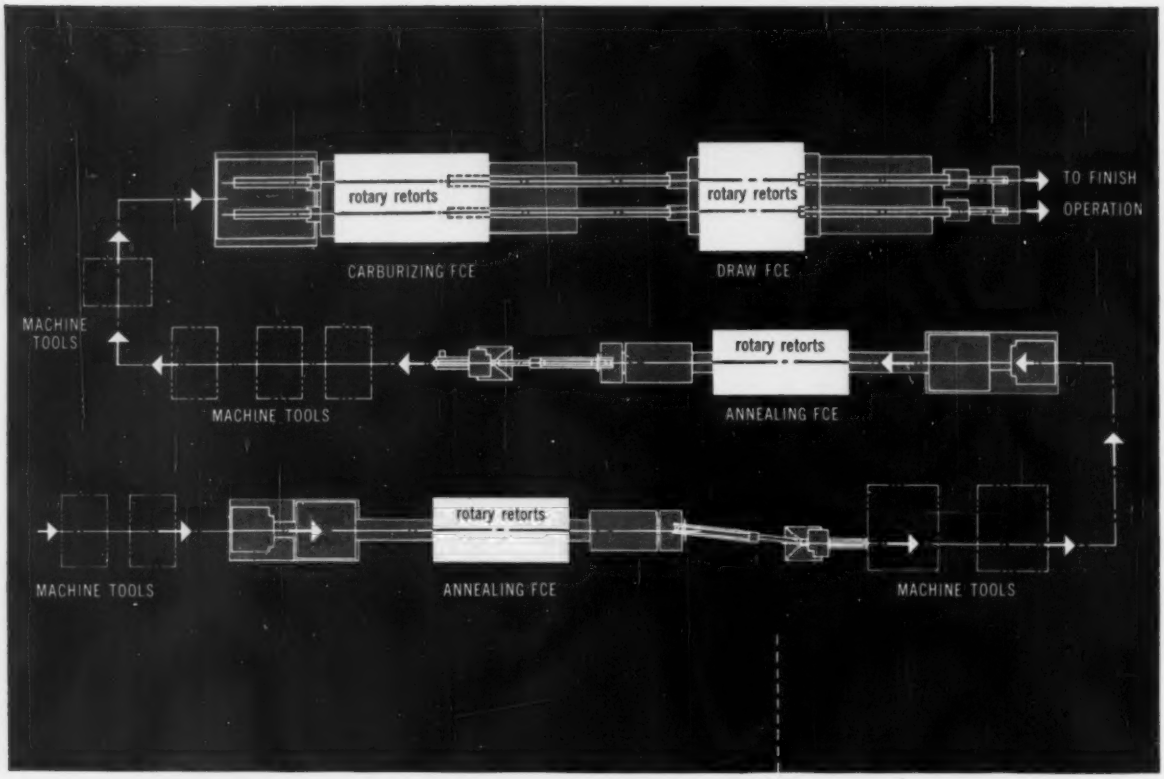
Making it Public . . . Another milestone passed in 1955 was the decision to put Ford Motor Co. stock on the market. Ford is about the last of the large industries to be family-owned and sale of stock to the public recalls the late Henry Ford's determination to run the company himself.

It will be years before stock is spread far enough for Ford family members to lose control of the giant auto empire, if ever. But the decision to market stock at least in theory establishes the principle of public ownership.

It's doubtful if Mr. Ford would have approved, but changing times made the sale necessary.

THE BULL OF THE WOODS — By J. R. Williams


WHAT, NO LAUGHS? HARDLY ANYBODY LAUGHS AROUND HERE ANY MORE AT THEIR WORK-- IT'S LIKE A MORGUE!
WHAT FOR? WE'VE SEEN IT ALL IN TH' COMICS OR TV OR MOVIES, OR HEARD IT ON TH' RADIO-- THERE'S NOTHING NEW TO LAUGH AT!
OIL
THE DEAD PANS
J.R. WILLIAMS



'Surface' lines 'em up furnaces, machines, costs

There's more than one way to automate furnaces for high production, lower costs, and uniform quality—and 'Surface' engineers can show you a good many of them.

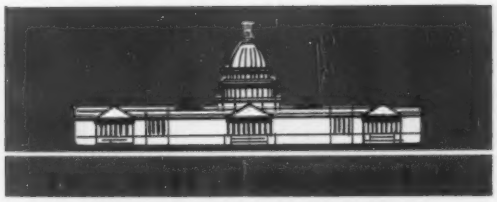
Dana Corporation, Marion Division, is a good illustration of the range of 'Surface' automation available. There you can see (1) different furnaces linked with machines at separate points on the line, (2) a self-contained automatic heat treat line within the production line, and (3) single furnace units with work handling completely automatic within each furnace.

Each of these types of automation results in higher production, more uniform quality, and lower handling costs than can be achieved in the conventional, isolated heat treat department. The point to remember is that these advantages aren't limited to high production plants; they can be applied to smaller operations as well. The sooner you apply them, the sooner they will pay off for you.

Write for the Heat Treat automation story today, Bulletin H55-11

Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO
Also makers of Janitrol automatic space heating and Kathabar humidity conditioning units



All Signs Point to Another Big Year

Booming incomes promise continued spending spree . . . Production may go over the $500-billion mark . . . Record outlays for factories in the first quarter . . . Tax cuts, credit, laws—*By G. H. Baker.*

◆ ANOTHER 12 months of boom business, sparked by strong consumer demand and buttressed by a high level of defense spending, is in the making.

A record output of goods and services is anticipated. And some carefully-drawn government studies indicate that consumers will continue to sign up for new homes, new automobiles, and new appliances and furnishings at or near the 1955 volume of business.

Inventories probably will rise a bit above their 1955 levels—which, for most industries, was on the low side. Continued high consumption will tend to hold inventories down.

How They Look . . . Gross national product—the total value of all goods and services produced—probably will go beyond the $500 billion mark. GNP is now running at the rate of about $390 billion a year.

Personal income is flowing at the annual rate of about $308 billion—another all-time record.

Some further price rises—both industrial prices and consumer prices—are in the offing. These coming increases are a delayed reaction of the 1955 cost increases in steel, copper, aluminum, and other key industrial commodities.

Begin to Hurt . . . Many of the increases are only now having their effect on consumer selling prices. The higher steel prices announced for some lines in December, 1955, will have their effects on wholesale and retail prices later this winter and this spring.

It is now clear that nearly everything made of metal is going to cost more in 1956.

Food, on the basis of latest market summaries and forecasts, probably won't cost much more this year. True, prices of individual food items at the supermarket have been nudging upward in recent months, but corresponding declines in livestock prices have just about offset the increases. All meats—particularly pork—are retailing at their lowest average prices since before the Korean War, government figures show.

Finance Factories . . . Business will dip into its collective pocket to finance a record amount of new factories and equipment during the first three months of 1956. Outlays by primary metals producers, however, will slip below the rate set in the fourth quarter of 1955.

Spending for new production facilities in the first quarter of 1956 will hit a spectacular annual rate of $31.5 billion—well above the $28.3 billion rate set in 1955 and the four-quarter, 1955, rate of $29.5 billion.

Figures compiled by the Commerce Dept. and the Securities and Exchange Commission also indicate that hefty capital spending by business will extend into the second quarter and probably throughout 1956.

See Rails Push . . . Biggest outlays expected in the January-March period are by railroads, which plan to spend $357 million (55 pct above the 1955 average), and manufacturing, which will spend $3.1 billion—18 pct more than in 1955.

Durable goods firms expect to increase plant outlays by 25 pct, and nondurable industries by 12 pct over 1955.

Primary iron and steel industry will spend $265 million in the first quarter, compared with $274 million in the last quarter of 1955. Nonferrous spending is estimated at $73 million, compared with $80 million in the fourth quarter of 1955.

Cash Rolls In . . . Boom-level tax collections from corporations, from individuals, and from sales are pushing the federal government's cash income ahead of its expenditures. As a result, a reduction in tax rates shapes up as a strong possibility for 1956.

Individual taxpayers probably will harvest the only tax-cut plums to be handed out, however. The corporation rate (52 pct) is not likely to be trimmed, and the possibility of cuts in excises is slight.

Plan Bomb Blasts

■ Testing of a whole new assortment of types and sizes of atom bombs is now definitely slated for the U. S. proving ground in the Eniwetok atoll this Spring. At least one of the new bombs to be tried out will be an H-bomb that will compare roughly with "millions of tons" of TNT, one official predicts.

The Engineer from Continental Screw Co. ...

Here's Why Holtite-Nylok Locks Securely
HOW NYLOK LOCKS
(patented)
A
B
Resilient Nylon plug (A) sets up lateral thrust, smoothly wedging mating threads together (B). All of locking action is on the threads; head is not stressed. Locking is postive seated or unseated.

...will study your specific requirements for Holtite Nylok Screws at no cost to you!

Talk to the Engineer from Continental about 1-piece self-locking screws and bolts

Manufacturers all over the nation are saving time and money by switching to Holtite Nylok Screws. These amazing self-locking screws and bolts eliminate safety wire, lock washers, jam nuts, and various other locking devices.

The secret behind their smooth efficiency is a nylon insert in the threaded section which provides a positive-locking action. Seated or unseated, they lock where they stop. Our engineers will be happy to study your specific requirements and make the correct recommendations *at no cost to your company.*

Remember, Holtite Nylok Screws and Bolts give you these advantages:

1. Positive locking
2. One piece; eliminates separate auxiliary parts
3. Readily replaced
4. Interchangeable
5. Re-usable
6. Locks seated or unseated
7. Defies vibration
8. No harm to mating threads of parts
9. Acts as a seal for gases and liquids under high pressures
10. Locks where it stops

It will pay you to talk over your fastener problems with the Continental Engineers.

Only Continental Engineers Are Required To Have This Training

Each engineer at Continental is required to undergo thorough experience producing ground thread taps and gages, with their exacting screw thread dimensions. This special training is passed on to you—at no extra cost.

CONTINENTAL SCREW COMPANY INC. 1904

You Can Always Count on Continental

Continental Screw Co.

Manufacturers of Holtite Fastenings

New Bedford, Massachusetts, U.S.A.

Slash Sure . . . Lower rates for individuals seem assured, as the Republican Administration unfolds a dignified bid to the voters for a renewal of its four-year lease on the White House.

Meanwhile, the Democrat-controlled Congress, eager to increase its majorities in Congress and hopeful of recapturing the White House, is wooing voters with the soft, sweet melody of tax cuts for nearly all wage-earners.

Bigger exemptions, rather than outright rate reductions, is the proposal most likely to succeed when the Senate and the House get down to the brass tacks of writing the specific language of the revenue revision bill.

Members of both parties believe the "lower exemption" method will win them the largest number of votes.

You Can Expect . . . The way the tax-cut program is shaping up, you can reasonably expect to find Congress voting to increase each taxpayer's exemptions by $100 apiece. Thus, a family of four, with one wage-earner, would find its taxable income $400 less than it was prior to the upcoming new tax law.

Effective date for the new rates will be decided in the Spring, when the Senate and the House get around to working out the fine points of their election-year jollybox of tax-cut goodies.

Credit Splurge . . . Americans aren't apt to slow down their orgy of on-the-cuff buying in 1956. All previous records for consumer credit toppled last year, and there are lots of reasons to believe splurging families will continue to sign on the dotted line for the goods and services they want and expect to pay for later.

Consumer credit is tied pretty closely to consumer confidence. And consumer confidence is going to be even further buoyed this year by (1) Politicians promising better times; (2) Expectations of a tax cut (no matter how small); (3) Higher wages as production strains to keep pace; (4) More and better selling of more and better cars, appliances, clothes, furniture, and other consumer goods.

Can't Curb Buying . . . The government at present has no power to do more than slightly dent consumer credit buying, and Federal Reserve Board says it won't ask Congress for any new controls over consumer credit.

While FRB can tighten business credit, and thus make it slightly harder for stores to further expand charge accounts and short term loans, there is every indication that early 1956 will see an easing of this restriction.

Consumers in 1956 should keep right on dancing to the "nothing-down, almost-nothing-a-week" tune for at least another year.

Probes and Laws . . . Automobile manufacturers will again draw the fire of the politicians in 1956, but it's hard to see how any basically harmful legislation will result.

Most that can happen in the way of new laws affecting the industry is legislation making it illegal for unfranchised dealers to sell new cars, and a federal prohibition against billing customers for freight charges not actually incurred ("phantom freight").

This is about as far as Congress will go, and the leadership may call off the dogs before it goes this

"THEY have to build a fire under Joe to get him started."

WASHINGTON NEWS

far. There'll be plenty of talk about the "need" to break up some corporate giants like General Motors, but little or no action.

Car Laws Pend . . . Best chance of decisive moves by Congress relates to the phantom freight and car bootlegging issues. Legislation dealing with both problems is held over from the last session. In the dealer survey, retailers were asked to sound off about them.

Urged by spokesmen for organized dealers, Congress is to give serious study to phantom freight and bootlegging. If the Williams bill (H. R. 5947) is enacted, the burden of preventing new cars from being delivered to nonfranchised persons for resale will be placed on the manufacturer.

The Hinshaw bill (H. R. 528) would make it illegal to charge fictitious amounts for delivery of new cars to dealers.

Push Atomic Work . . . Intensified efforts are to be made this year by industry and government to have the atom perform more productive work.

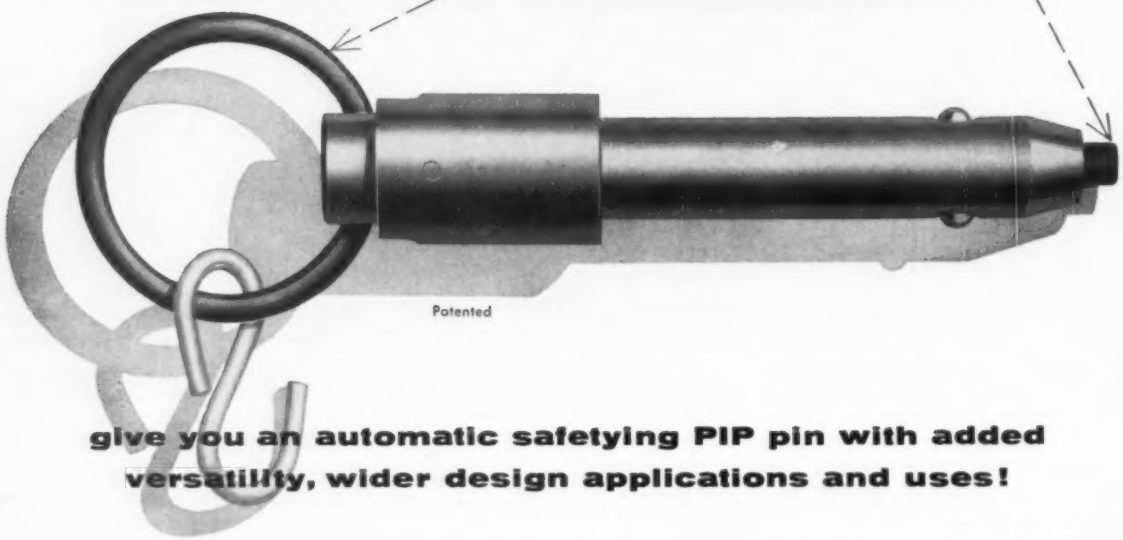
Special attention is being given to development of electric power from nuclear sources at reduced rates. Industrial companies are readying plans to hasten the time when the atom can be a cheap power source and will make their plans known soon.

The AEC expects to get by Feb. 1 new proposals for construction of reactor plants in ranges from 5,000 to 10,000 kw, 10,000 to 20,000 kw, and 20,000 to 40,000 kw. Some type of assistance is to be provided each organization with an acceptable plan. Applicants and the agency will negotiate regarding the arrangements.

Offer Plan . . . One cooperative power association in the midwest offered a proposal last summer along the lines now indicated. It was somewhat ahead of AEC preparations to receive it, however, and the association has been asked to resubmit its plan.

2*

MAJOR IMPROVEMENTS-



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give you an automatic safetying PIP pin with added versatility, wider design applications and uses!

Like other PIP pins, the Model "B" double-acting pin is solving countless equipment and machine quick-disconnect problems. The continuous ring and extended spindle are changes enabling the "B" series PIP pin to work easily where stress loading or hole misalignment problems cause ordinary pins to bind and resist removal. The new continuous pull ring is designed for heavy duty use for forcible removal of "bound" pins. An intentional blow on the protruding head or tip shifts an inner spindle—locking balls recede into body of pin and pin moves with the blow for easy installation or removal.

Actually, the pin may be driven in or out! Both of these PIP design advantages, combined with higher material strength, are available in the "B" series pins which include "T", "L" and "Button" type head styles (optional) in sizes to most bolt standards.

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West Holds Strong Hand for New Year

Few weak spots to be found in West's '56 plans . . . But power shortage threatens aluminum output . . . New sources are needed . . . Steel grows at more than national rate . . . Aircraft strong—By R. R. Kay.

◆ A "SOLID GOLD CADILLAC" year in 1956 is in store for metalworking and metal producing in the 11 Western States.

Reason: Almost every segment is chalking up new high records. Soundings show they're going still higher. Only rub is material shortages.

Here's a thumbnail on what's ahead for 1956:

Aluminum . . . Few realize that some 18 pct of the nation's aluminum is swallowed up in the 11 Western States. Last year consumers devoured 270,000 tons. In 1956 they'll need much more—if they can get it.

Although the Pacific Northwest now produces one-third of the nation's primary aluminum—500,000 tons per year—big new production facilities are going East. There'll be a few new potlines and some specialized expansions here this year, but nothing major. Why? Lack of power.

Something definite has to be done now, or there'll be no new power on the lines after 1960. Many plans are on file but they're only "paper" kilowatts.

Steel . . . Users in the 11 Western States will gobble up 7.3 million tons in 1956—beating the record-breaking 7 million tons of 1955.

This fast growing steel market is galloping along at a terrific pace. One major steelmaker is figuring steel industry growth twice the national pace. Another will soon announce a big expansion. One thing is sure: the market is here and begging for steel. And western mills will expand to meet the demand. 1956 might well be the beginning of a huge capacity expansion program.

Aircraft . . . Steady and strong! That's the word for 1956 and 1957. Backlog will stay at the 1955 level. Military business will be down some but new commercial jetliner orders will make up for it. Fewer planes will be built—but they'll be larger, heavier.

The industry's position as the West Coast's largest manufacturing employer is safe by a country mile. Some 280,000 people — up 20,000 from a year ago—pick up a $30 million weekly paycheck. And they'll be doing it right through 1956.

Guided missile development and production will go along at the same high level.

"WHEN are you getting off that do-it-yourself kick?"

Electronics . . . Manufacturing boom is geared to the aircraft industry. Sales will be well over $1 billion this year. And the industry is growing at break-neck speed —a new plant a week since 1947— all good metalworking customers.

Trend: mergers within the industry to make bigger, stronger companies. And non-electronics firms are buying up going companies to get a foothold in this growth industry.

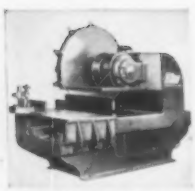
Auto Assembly . . . Automakers here sniff at opinions that the West Coast assembly plant output will slide in 1956. They look to match 1955's record of 800,000 units.

Chrysler, Ford, and General Motors, all in California, picked up a $300 million tab last year from automobile parts makers and suppliers here. They want to increase their purchases in the West.

Too many metalworking companies are still overlooking this big market. Proof: 1.5 million tons of motor vehicles and parts are shipped in from the East every year.

And California still leads the nation in auto registrations.

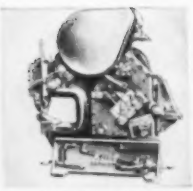
Shipbuilding . . . About the only segment of metalworking here that's in the dumps is shipbuilding. And the prospects are dark, unless some substantial orders come through real fast. One glimmer of hope: Navy Secretary Thomas promises a "fair share" of Navy's building and conversion program. But this would still leave the private yards in the doldrums for some time.



Horizontal Stroke Friction Saws

Down-Stroke Friction Saws

Hydraulic Power Units



Combination Shear, Punch & Coper

Punches

Bulldozers

Beam and Column Millers

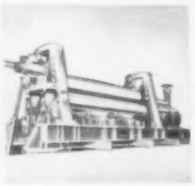
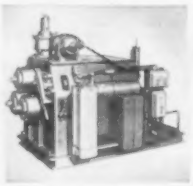
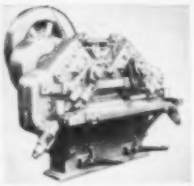


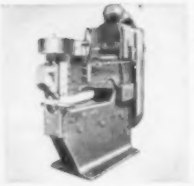
Plate Bending Rolls



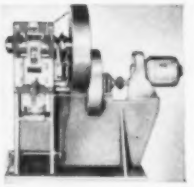
Angle Bending Rolls



Double Angle Shears



Rotary Shears



Guillotine Shears

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6177

In more than 30 cities all over the country, there are Kling distributors who can show you these Kling Metal Working Machines and tell you about the citations they are receiving for production records in "the best of companies".*

Call the distributor nearest you; he will be glad to be of service to you. If in doubt which distributor to contact, write us direct. We will be happy to answer your questions and send Complete Line Bulletin 100.

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ARKANSAS
See Tennessee, Oklahoma or Kansas
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Harron, Rickard & McCone Company of Southern California, Los Angeles 58, Calif.
COLORADO
Mine & Smelter Supply Co., Denver, Colo
Overgard Machinery Co., Denver 4, Colo.
CONNECTICUT See New York City
DELAWARE See Pennsylvania (Eastern)
DISTRICT OF COLUMBIA
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FLORIDA
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GEORGIA Noland Company, Atlanta, Ga.
IDAHO
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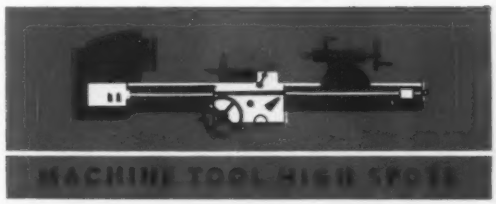
Marshall & Huschart Machinery Co., Indianapolis, Ind.
IOWA See Illinois (Northern)
KANSAS See Kansas City, Missouri
KENTUCKY See Ohio (Southern)
LOUISIANA
Dixie Mill Supply Co., New Orleans, La.
MAINE See Massachusetts
MARYLAND See District of Columbia
MASSACHUSETTS
Wigglesworth Machinery Co., East Boston, Mass.
MICHIGAN
J. Lee Hackett Company, Detroit, Mich.
MINNESOTA
Minnesota Steel Supply Co., Minneapolis, Minn
MISSISSIPPI See Louisiana
MISSOURI (Eastern)
Robert R. Stephens Machinery Co., St. Louis, Mo.
(Western) Robert R. Stephens Machinery Co., Kansas City 2, Mo.
MONTANA See Spokane, Wash.
NEBRASKA See Missouri
NEVADA See California (Northern)
NEW HAMPSHIRE See Massachusetts
NEW JERSEY (Northern) See New York
(Central and Southern) See Penn. (Eastern)
NEW MEXICO See California (Southern)
NEW YORK
Triplex Machine Tool Corp., New York, N.Y.
Macaulay Machinery Co., Rochester, N.Y.
NORTH CAROLINA
Armentrout Machinery Co., Greensboro, N. C.
NORTH DAKOTA See Minnesota
OHIO (Northern)
Hackett-Ohio Co., Cleveland 15, Ohio
(Southern)
McBeth Machinery Co., Cincinnati, Ohio
OKLAHOMA Hart Industrial Supply Co., Oklahoma City, Okla.
Industrial Equipment Co., Tulsa, Okla.
OREGON
Dawson Machinery Co., Portland, Oregon
Hallidie Machinery Co., Portland, Oregon
PENNSYLVANIA (Eastern)
J. A. Carlin Co., Bala-Cynwyd, (Phila.) Pa.
(Western)
McBeth Machinery Co., Pittsburgh, Pa.
RHODE ISLAND See Massachusetts
SOUTH CAROLINA See North Carolina
SOUTH DAKOTA See Minnesota
TENNESSEE
Noland Company, Chattanooga, Tenn.
TEXAS (Northern)
Hamilton Machinery Co., Dallas, Texas
(Southern)
Rex Supply Corp., Houston, Texas
UTAH
Mine & Smelter Supply Co., Salt Lake City, Utah
VERMONT See Massachusetts
VIRGINIA
Noland Company, Newport News, Va.
WASHINGTON
Dawson Machinery Co., Seattle, Wash.
Hallidie Machinery Co., Seattle, Spokane, Tacoma
WEST VIRGINIA
See Pennsylvania (Western) or Ohio (Southern)
WISCONSIN
John A. Staley Co., Milwaukee, Wis.
WYOMING See Colorado



Good 1956 Is in the Bag for Builders

New orders for automotive tooling are already placed with more to come . . . Industry eyes big replacement market . . . Believes it can convince plants they can't afford to be obsolete—*By E. J. Egan, Jr.*

◆ BUSINESS OUTLOOK appears bright for U. S. machine tool builders in 1956. Barring any accident to the current high level of industrial activity, both sales and shipments of metalworking equipment are expected to top 1955 totals.

Sound evidence for these optimistic predictions can be found in the builders' overall picture as the old year ends and the new one begins. Final quarter of 1955 showed new orders at levels that haven't been seen since the Korean emergency. And, as 1955 ended, shipments were edging up also. Net effect is that backlogs throughout the industry average about six months as 1956 gets underway.

Auto Tooling . . . Looking ahead at the next 12 months, several bright spots appear to bolster builders' high hopes. One is the continuing high level of activity throughout the automotive industry as tooling plans are hinted at for 1957 model cars.

From all indications, there will be an across-the-board design revolution in the automobiles that will appear this fall. Word is that it involves not only styling, but encompasses engines and other mechanical features. It's certain that where anything is envisioned on such a sweeping scale, the new metalworking equipment needed for mass production will cost millions of dollars.

Some of this machinery is already ordered, although no one is willing to say just how much. Best bet is that there is a considerable chunk still to be put on the books. Even last minute "dibs and dabs" could do much to help builders achieve their goal of a new order high for a peacetime year.

Replacement Market . . . But there is a still greater new-business potential than the one offered by the automotive and other mass production industries. It is represented by thousands of obsolete machine tools in the job shops and medium-run production plants that that do most of the nation's metalworking.

In previous years this has been the average builder's biggest headache—finding a way to convince the shop owner that more productive, more accurate machine tools were available. The key to open this tightly locked door may be the fact (and results of the fact) that a giant U. S. Machine Tool Show was held in Chicago last September.

"GREAT joke, boss, great."

First tip-off that builders were on the right track in demonstrating the perils of obsolescence came during the Show itself. Attendance was considerably above most builders' expectations. And visitor interest and enthusiasm seemed even more so.

Some proof that Show visitors weren't asking searching questions out of idle curiosity came immediately after builders packed up their exhibits. New orders for metal-cutting equipment alone came to $103.4 million in October. This was the best new business month the industry had seen since July, 1952.

Just in case the memories of Show visitors might be on the short side, builders and distributors of machine tools will press harder than ever this year at refreshing them. They'll draw and redraw the picture of obsolescence wherever it fits. And there are many areas to work on, such as inadequate horsepower, lack of automatic controls, questionable accuracy, slow speeds, inability to use carbide tooling, and many others.

And this year, too, more than ever before, builders are better equipped to answer the complaint of "I just can't afford it." A wide variety of virtually painless financing plans are available that allow the buyer to pay for new equipment out of its higher earning capacity.

All in all, machine tool builders find themselves in one of the most healthy climates they have experienced in years.

WEIGH FIRST COSTS

of CMP restricted specification cold rolled strip steel

True costs of cold rolled strip steel are oftentimes clouded by unfamiliarity of the full potential with a specially tailored product such as CMP processes.

Typical of the reductions in overall manufacturing costs that can often be recorded with the use of CMP restricted specification strip, is the elimination of manual costs involved in the tear-down and re-assembly of components rejected for malfunctioning due to steel dimensional variations. Where precision fitting of components is essential to satisfactory equipment operation, the extra steel cost for close gauge accuracy is more than offset by greater parts production per machine hour and reduction or elimination of rejects at final assembly. Add to this the lower end product cost resulting from longer tool life, fewer coil changes on production equipment and other labor cost items.

The conclusion often is that it pays to buy a premium specification product to lower the cost of an end product employing cold rolled carbon, alloy or stainless strip steel.

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WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

AGAINST CMP ADVANTAGES

PRECISION COLD ROLLED CMP STRIP STEEL

the Cold Metal Products co.
GENERAL OFFICES: YOUNGSTOWN 1, OHIO

PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: New York • Cleveland • Detroit • Indianapolis
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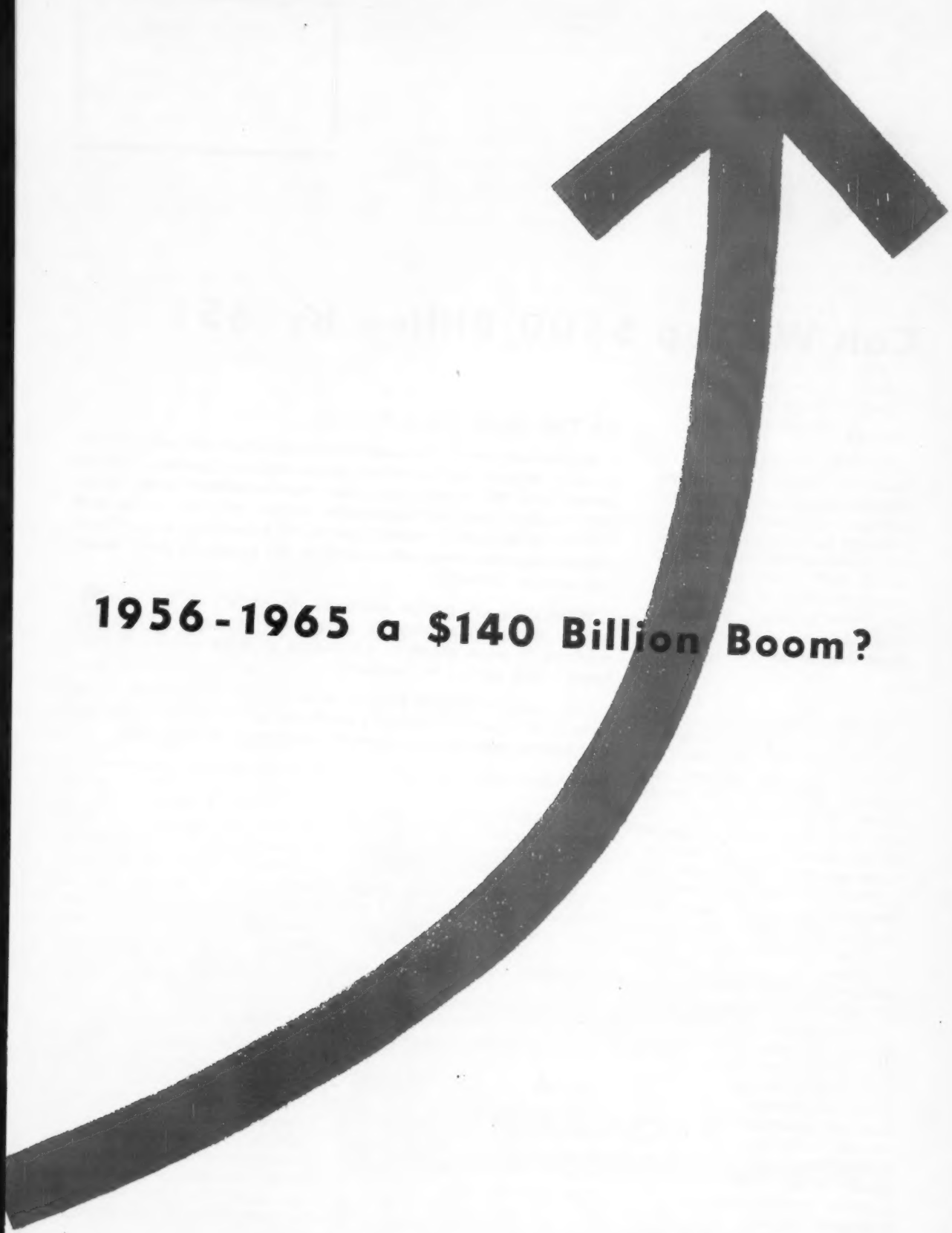


1956-1965 a $140 Billion Boom?

By ARNO H. JOHNSON
Vice President
and Director of Research
J. Walter Thompson Co.,
New York

Can We Top $500 Billion by '65?

Do You Share These Fears?

▪ Despite—or perhaps because of—the fact that the United States is today enjoying unprecedented prosperity many business men are uneasy over the future. They fear that installment credit is too high, wonder when the automobile market will fall out of bed, whether metalworking markets are really broadening or just being temporarily stimulated and whether or not corporate debt threatens financial stability.

▪ While these are logical questions, the editors of The Iron Age believe that it is possible to solve these problems and for the economy to move ahead to a standard of living which will make today's look shabby by contrast.

Here noted economist Arno H. Johnson answers questions on the outlook for a growing economy and backs up his answers with facts and figures based on his 30 years' experience in marketing.

—Q

President Eisenhower, in his Economic Report to Congress (January 20, 1955), said that "our country can within a decade increase its production from the current annual level of about $360 billion to $500 billion, or more, expressed in dollars of the same buying power." What would this mean in terms of consumer purchases and savings?

—A

Of course such an increase is perfectly possible. You may not realize it, but our increased productivity since 1940 has already raised real purchasing power by 92 pct—even after adjusting for inflation, higher taxes and heavy defense spending. This means that a $500 billion level could yield disposable income to individuals, after taxes of $375 billion. The public could spend $350 billion of this—in contrast to a figure of $237 billion in 1954—and there'd still be $25 billion left for savings.

Put it another way: If, during the next five years we increase the productivity per capita of our labor force at the rate it increased during the 1950-55 period we shall have the opportunity for a gross national production of at least $430 billion. That could yield disposable income of $320 billion and a level of personal consumption expenditures of over $300 billion. You can contrast this latter figure with just $245.8 billion in the first quarter of 1955. And if this rate of productivity increase continued to 1965 it would indicate a level of production of over $500 billion. Again this checks with the President's goal.

—Q

Doesn't increasing population mean lower living standards—as the old economists used to say?

—A

On the contrary. In 1956 there will probably be 6½ times as many families (consumer spending units) with incomes over $3000 as there were in prewar 1941. The number of U. S. families is expected to total 56 million this year—or 42 pct more than in 1941. The 37.5 million with income over $3000 will be 67 pct of the total—against 5.7 million, or 14½ pct of the 1941 total.

—Q

What about families earning more than $3000 a year?

—A

That's an interesting picture. In four years—between 1950 and 1954—the number of families with incomes of over $4000 after taxes jumped from 12.2 million to 21.4 million. This year this figure may reach 25.8 million—or more than double the number in that group as recently as 1950. And, at the production level of $430 billion pos-

sible five years from now, the number of families with over $4000 a year after taxes could climb to 36 million, or triple the 1950 figure. As families move up the economic ladder their discretionary spending power goes up sharply.

—Q

What do you mean by "discretionary spending power?"

—A

As the term is used here it means what people have left after paying their taxes and basic living costs for food, clothing and shelter necessary to maintain a 1940 standard of living.

—Q

How much of an increase is discretionary spending power do you think is possible during the next 10 years?

—A

Let's go back a bit. The prewar U. S. economy was typified by the $25 a week family: Average weekly earnings in manufacturing in 1940 were $25.20. The "middle income" family fell in the $1000 to $1500 income group. Now the "middle income" family is in the $4000 to $5000 income group.

Weekly earnings in manufacturing by October 1955 had grown to $78.69, or over three times the 1940 level. After taking into account both increased taxes and present costs of maintaining an equivalent 1940 standard of living in the necessities of food, clothing and shelter, the middle income family now has discretionary spending power over five times as great as the prewar middle income family.

—Q

Are you talking about families or total population?

—A

We were talking about families. But total discretionary spending power for our entire population, which reached the $145 billion a year rate in the first quarter of 1955, was nearly 5½ times as great as the $26.9 billion in 1940. In all cases here we are correcting for present prices so there's no inflationary factor built in. This figure could reach $195 billion in 1960, or a third above the 1955 rate. And, on the basis of the $500 billion production goal in 1965, the discretionary spending power could reach $240 billion, or an increase of 65 pct over the 1955 peak level.

—Q

So far you have been talking about dollars. Can you suggest what this might mean to companies in the metalworking field?

—A

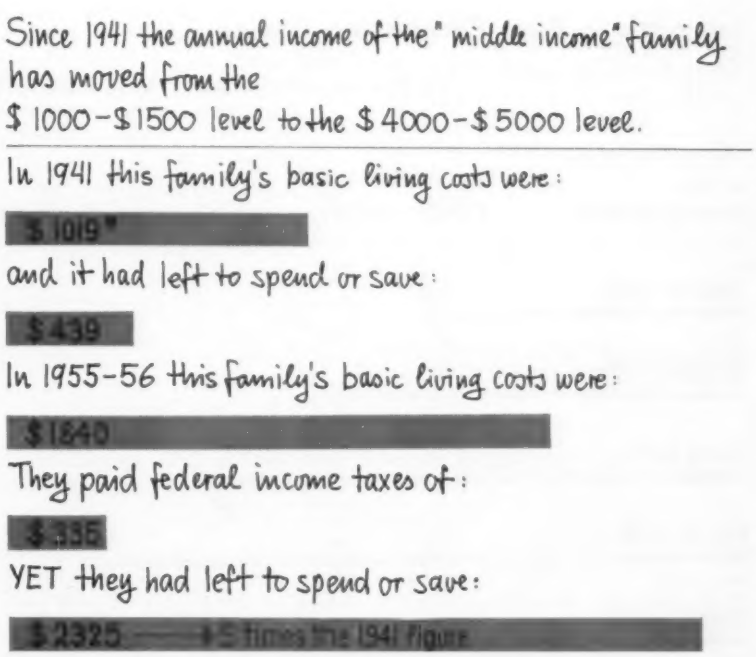
In a way, yes. It represents a huge pool of new purchasing power dependent on the whim of the individuals as to how it will be used. At this rate, people have the money —and should continue to have even more—to select and choose between an infinite variety of items beyond the bare necessities. People may buy cars—or better cars. They may buy better housing or more appliances. But there is no guarantee that metal producers or those who make products of metal will automatically share in this huge potential increase. In fact, in 1956 alone we must *sell* $40 billion *more* goods and services to consumers than were sold in 1954 to assure a continuing expansion in our economy. To achieve the $350 billion sales needed to support our $500 billion production ability in 1965 we will have to sell, among other things, $16 billion more durable goods than in 1954. We will have to re-examine sales organizations and advertising budgets to see if they are adequate.

—Q

Has purchasing power risen very much since 1940, or has most of it been absorbed in higher prices?

Discretionary Spending Power Up 5 Times

(Typical Middle Income Family)


Since 1941 the annual income of the "middle income" family has moved from the $1000-$1500 level to the $4000-$5000 level.
In 1941 this family's basic living costs were:
$1019*
and it had left to spend or save:
$439
In 1955-56 this family's basic living costs were:
$1840
They paid federal income taxes of:
$336
YET they had left to spend or save:
$2325
*) Which includes federal income tax: $2.00
Basic living costs in 1955-56 assume same standard of living as in 1941.

—A

In spite of higher prices, *real* purchasing power has risen sharply. It is estimated, on the basis of present trends, that in 1956 the real purchasing power of the nation will be 92 pct greater than in 1940.

—Q

But do people actually have more ready cash or is this boom based on borrowing?

—A

We'll get around to borrowing a bit later but the fact is consumers have four times the liquid assets that they had in 1940, in dollar volume.

—Q

What are liquid assets and what would this amount to in terms of 1940 dollars?

—A

Liquid assets are bank deposits, U. S. Government securities, savings and loan shares and currency. Correcting for the change in the consumer price index (a 91 pct increase from January 1940 to January 1955) you still find that in terms of real purchasing power, these assets are more than double what they were in 1940.

—Q

How have business assets fared during this period?

—A

Business has added $58.1 billion in liquid assets since 1940 to reach a total four times the 1940 level, also with double the real purchasing power. This certainly suggests a continued high level of industrial strength and purchasing power.

—Q

Mr. Johnson, there is a lot of concern today over the extent to which consumers have borrowed money—over consumer debt.

—A

Of course consumer debt, at over $122 billion, is high. This includes home and farm mortgages as well as consumer credit. But it is actually lower in relation to accumulated earnings than in prewar years. The way it breaks down is shown in an accompanying table.

I think you should also note that 71 pct of the increase in consumer debt since 1940 is in home mortgages. Since these are amortizing mortgages the principal is not likely to become a critical burden on the economy during any temporary recession and the monthly burden is similar to rent payments. In fact, much of this is a substitute for rent since there has been a rapid movement from renting to home ownership. Even so, about half of owner-occupied non-farm homes are entirely free of mortgage debt.

—Q

You mentioned discretionary spending power. Does this have any relation to consumer credit?

—A

Actually, consumer short term credit is low in relation to discretionary spending power. The present level of consumer credit (about $35 billion) worries some people—it is just about four times what it was in 1940. But consumer discretionary spending power this year is expected to be *six* times the 1940 level. The ratio of consumer credit to discretionary spending power has dropped from 31 pct in 1940 to about 22 pct today.

—Q

Does this suggest that consumer credit could be expanded substantially?

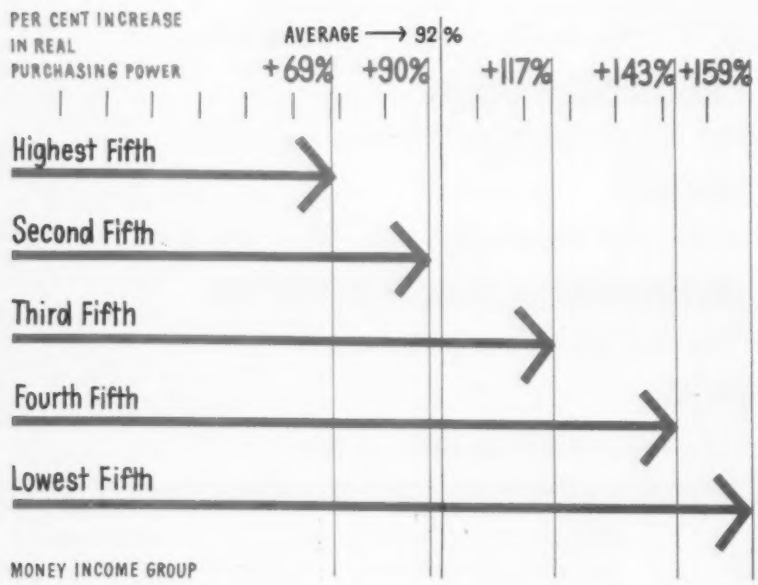
—A

Yes, installment sales, charge accounts and personal loans—the things that make up short term credit—could actually be expanded by 60 pct over the high 1955 level without being overextended in relation to discretionary spending power. Just to reach the 1940 level could add about $20 billion to current purchasing power. This is shown in an accompanying table.

Disposable income (personal income after Federal and local taxes)

Increase in Real Purchasing Power

(By five economic groups—1940 to 1956, Est.)



Consumer Debt

Is Low In Relation to Individual Savings

Relation of total consumer debt:	1929*	1940*	1955**
To disposable income	42% of income	42% of income	46% of income
To savings	72% of savings	47% of savings	43% of savings
Relation of short term consumer credit:			
To disposable income	8% of income	11% of income	12% of income
To savings	13% of savings	12% of savings	11% of savings

*End of Year. **Mid Year.

has frequently been used as a national yardstick of the amount of consumer credit that the economy can carry safely. In the period from 1929 to 1939 consumer credit outstanding ranged between 7 and 10 pct of disposable income. In 1940 it was 11 pct, then dropped to as low as 3½ pct during the war peak of 1943-44. The 1940 relationship of 11 pct has somehow gained acceptance as the "ceiling" beyond which it would be dangerous to allow consumer credit to expand. By May 1955, the $31.6 billion of consumer credit, or approximately 12 pct of the $261.0 billion rate of disposable income had broken the mythical ceiling. But, in relation to discretionary income, the ratio of consumer credit had dropped from 31 to 22 pct.

Relating consumer credit to consumer disposable income at least has the value of using something as a measuring rod, but nobody goes on to determine whether the prewar relationship was valid and can serve as a proper proportion.

Consumer disposable income is not a proper yardstick for consumer credit because it has changed in character as a result of our increased productivity and rapid change in the income distribution of families. As families have moved up from one income group to the next there has been a disproportionate change in their "discretionary" income—in their ability to save or to buy things beyond the bare necessities.

When the total of discretionary spending power is charted year by year from 1929 to 1954 and compared with the total consumer credit, a spectacular *growth* is shown in the amount of free purchasing power that is left over—*even after substracting the amount that would be required to pay off entirely the outstanding consumer credit.*

In 1940, for example, the $26.9 billion of discretionary spending power provided an excess of $18.6 billion over what would be needed to retire the $8.3 billion of consumer credit. But, as of May 1955, the excess was $113.4 billion or six times as large as in 1940.

This changed relationship should be taken into account. The ability to handle consumer credit increases faster than the disposable income. It seems logical, therefore, that consumer credit outstanding should reach levels considerably higher than the prewar relationship to disposable income.

With an expected increase in disposable income up to $280 billion in 1956, discretionary spending power should grow up to $163 billion which means consumer credit could expand by 60 pct to over $50 billion outstanding without exceeding the prewar relationship of 31 pct of discretionary spending power.

—Q

You can't think of consumer credit without thinking of the market for automobiles and appliances. Apparently you don't agree that the automobile market is "saturated" or auto credit overextended?

—A

Overextended when 69 pct of today's car owners don't owe a cent on their cars? Saturated? No. Market analysis of new and changed conditions of purchasing power and real need for automobiles indicates a potential market for over 6 million new cars a year for many years to come.

—Q

But there are supposed to be a lot of cars piling up in vacant lots. If you ride along the railroad tracks near . . .

—A

We're talking here of long term demand which indicates an annual

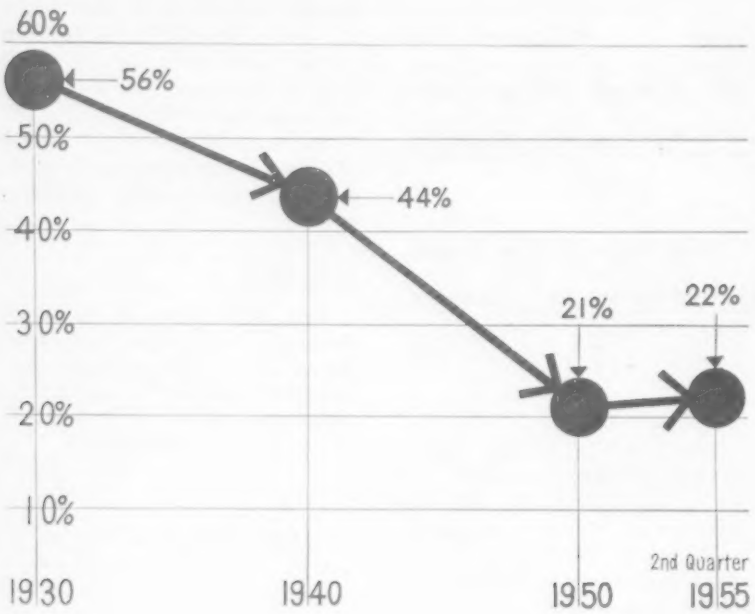
Consumer Credit

Could Expand 60 Pct This Year Without Exceeding 1940 Ratio to Discretionary Spending Power

In 1955, when disposable income was $261 billion a year (first quarter rate) and basic living costs were $116 billion, there remained some $145 billion in discretionary spending power. Of this, $31.6 billion was outstanding consumer credit, the balance being $113.4 billion in excess spending power.

With 1956 potential disposable income of $280 billion, basic living costs should be about $117 billion. Assuming $112.5 billion excess spending power still permits consumer credit to hit $50.5 billion, or 60 pct over 1955.

How Corporate Long Term Debt Has Declined In Relation To Production



potential of 6.2 million cars. On top of the replacement market (3.5 million a year); the additional million cars a year of new owners; some 600,000 from new family formations, there is a 1.1 million potential in sales of a "second" car.

—Q How about the national debt? Most people "view it with alarm."

—A Trouble here is that few of these people seem to realize the significance of the rapid decline in the ratio of total debt to total production.

—Q But isn't public and private debt a lot higher than it was during the depression?

—A It is true that total public and private debt in the United States is three times greater in dollars than it was in 1930. But it amounts to just 160 pct of a year's production today, whereas in 1930 it was more than double the year's production.

—Q Is it a fair guess that the tremendous corporate expansion of recent years has put corporate debt structure on an extended limb?

—A Quite the contrary. Net corporate long term debt has dropped to half its prewar relationship to national production. In 1930 corporate long term debt represented 56 pct of a year's production and in 1940 it was 44 pct. By 1955 this relationship was cut in half; long term corporate debt was only 22 pct of a year's production. Another interesting figure, if you want one that's not in terms of production: Net working capital as a per cent of long term debt increased from 63 pct in 1940 to 117 pct in 1955. Over the next five to ten years there will be massive needs for new capital investment in improved productive facilities if we are to reach the production and consumption levels of which we shall be capable in 1965.

—Q Then you're not a "viewer with alarm"?

—A It would be better if we were concerned less with the size of the debt and more with how to expand consumer purchases and our standard of living fast enough to utilize our productive ability. In this way we would keep our growing labor force fully employed.

—Q You mentioned a $40 billion higher standard of living for this year and a 50 pct increase by 1965. What other factors are involved?

—A Well, it may sound corny to some people but the unvarnished figures show that there is an increased trend toward family life and family living that puts a tremendous upward pressure on our living standards. This trend to family life is reflected in the rapid increase in number of families; in a higher percentage of the population being married; in marriages at an earlier age; in an extraordinary increase in the number of children under 10 in our population resulting in more children per family, and a higher percentage of families having children; in a rapid increase in home ownership, and in expenditures for activities of home life; in the mushroom growth of television in the home; in a movement of population to the suburbs; in the rapid growth of shopping centers and self-service distribution; and in a resurgence of religious worship and church membership as shown by the growth of 51 pct in church membership from 1940 to 1954 while population was increasing 22 pct.

—Q Does all this mean that metalworking—since it cuts across all industry—should be up by 50 pct in 10 years?

PLANT AND EQUIPMENT NEEDS

How Producers' Needs Follow Consumer Discretionary Spending Power

SPENDING has been at a high rate for new plant and equipment since the end of World War II. In those 10 years total is triple that spent in previous 17 years — including the war. But rate has not been excessive in terms of increased consumer spending power. Not only is U. S. population growing rapidly, its character is changing—demanding more durable goods. Increase in past 3 years has kept pace with rise in consumers' discretionary spending power.

	Producers' Plant and Equipment Investment (Billion)	Consumer Discretionary Spending Power (Billion)	Total Consumer Purchases of Goods and Services (Billion)
Prewar			
1939	$ 6.3	$ 22.0	$ 67.6
1940	8.0	26.9	71.9
1941	10.0	40.9	81.9
3 Year Average	$ 8.1	$ 29.9	$ 73.8
Present			
1953	$38.2	$137.4	$230.6
1954	36.6	139.8	236.5
1955 (3rd Qr.)	41.2	155.7	256.0
3 Year Average	$38.7	$144.3	$241.0
Increase from prewar average to present	4.7 times	4.8 times	3.3 times

—A

The metalworking industry has that opportunity but it certainly is not guaranteed. With more and more of the consumer's income in the form of discretionary spending power, competition for the consumer's choice is broader. It goes beyond just brand versus brand. It will include competition between whole product classes or entirely different interests—such as travel. If the metalworking industry is to share in a sharply higher standard of living it will have to do it by hard selling.

—Q

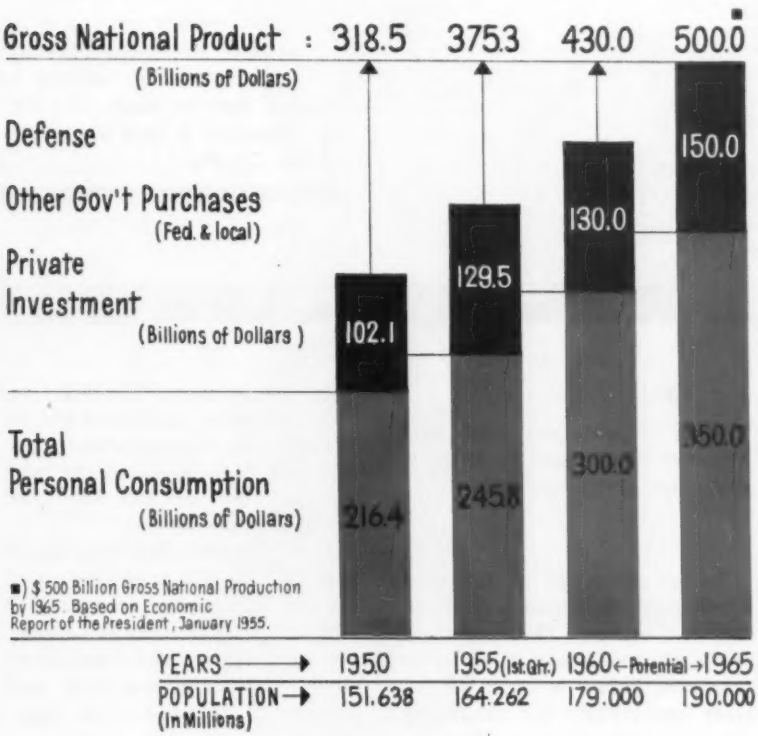
And if that were done what do you think of the chances for this increase?

—A

Actually, the opportunity for the metalworking industry to expand could extend beyond the figure of 50 pct in the next ten years if the current relationship between discretionary spending power and the investment in producers plant and equipment were to continue.

In the last three years (1953-1955) investment in producers' new plant and equipment (including farm equipment and all private construction other than residential non-farm) averaged $37.9 billion annually. This was 4.7 times the prewar level of $8.1 billion annually (3 year average of 1939-1941). This increase in plant and equipment need was almost exactly parallel to the increase in consumer discretionary spending power which increased 4.8 times in the same period. And discretionary spending power in the $500 billion economy possible in 1965 could be *65 pct greater* than the 1955 peak. To keep up with this expansion could mean markets two-thirds greater for metalworking industries.

Opportunity For Market Expansion



In the 10 years since World War II (1946-1955 inclusive) about $315 billion have been invested in producers' new plant and equipment. This 10 year total is 4½ times the amount invested in the previous 10 years ($73 billion 1936-1945 inclusive). It is three times the total investment of the previous 17 years ($110 billion 1929-1945 inclusive). This in itself means a vastly increased market for maintenance. But this vast growth in plant improvement and expansion has just barely kept up with the growth in consumer discretionary spending power. Our expanding standard of living will require further expansion in this area as well as in expanded demands for new and improved schools, highways, hospitals, and other public construction.

—Q

A while back you mentioned population increases. How does this specifically affect industry?

—A

There's been a huge increase in the number of children—67 pct more under 5 years of age now than there were in 1940, and 61 pct more in the 5 to 9 age group. This will soon cause public outcry against inadequate school facilities. And of course it will affect housing requirements.

—Q

And the labor force?

—A

Yes, this will become an important market factor by 1960. The year 1954 was the low point in many years in the number becoming 21. From now on this factor will change to the positive side pointing to increased family formation and an increasing labor force.

—Q

Can you estimate the increase percentagewise?

—A

Ten years from now the number reaching 21 will be some 51 pct over present levels. After 15 years —from 1971 to 1975—those reaching the family formation stage will be 68 pct greater in number than now.

—Q

Are there any other factors that affect standard of living?

—A

One factor, sometimes overlooked, is education. A population containing over 44 million high school graduates — as we have now—is quite different from a population with 23 million, as in 1940. The college level is up too, and these can influence the market through the acceptance or the desire for a better standard of living.

—Q

Do you have some figures on the swing to the suburbs?

—A

Between 1940 and 1955 population in the suburban portion of 162 Metropolitan Areas grew 59 pct while the Central Cities grew 20 pct and the rest of the United States, outside of these 162 Metropolitan Areas, increased only 10 pct. This means continued pressure for, among other things, suburban shopping centers and multiple car ownership.

—Q

But isn't there a problem in declining farm population?

—A

It's true that there's been a rather sharp drop in percentage of farm population to the total but it hasn't caused lowered farm production. On the contrary, total farm output (measured in physical units) increased by 28 pct between 1940 and 1954, with output per man hour increasing by 78 pct because of a number of factors, among them increasing mechanization.

—Q

Aside from farm equipment sales, what does this mean generally?

—A

To industry you mean? Well, it means a major shift upward in the standard of living and purchasing power of the remaining farm families. Before the war only 11 pct had electric service; now the figure is 91 pct.

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A limited number of copies of this special economic forecast can be obtained by writing to Readers' Service Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

What Can You Do About It?

—Q

What steps do you think businessmen should take to share in this great growth potential?

—A

To my mind one of the most important things to do is raise our sights in selling. The magnitude of the job to be done in changing consumer habits as well as the great opportunity for expanding sales certainly suggests this.

It also suggests the need for reorientation of objectives and reexamination of markets and methods—not in relation to the past but in view of the new and changed opportunities.

Just to meet the President's goal of $500 billion of production by 1965 will require an expansion of over 50 pct in sales to consumers — an almost revolutionary change in living standards and concepts of the mass of our population.

Automotive Steering Knuckle Support
forged from 1-15/16" Hot Rolled Round
AISI Grade 1340

FORGEABILITY

MACHINABILITY

HEAT TREATING PROPERTIES

BALANCED TO CUT YOUR COSTS

J&L STEEL

Forging Quality Steel Bars

Balance—the correct proportion of forgeability, machinability, and heat treating properties in forging steels—directly affects your profits. Balance of these properties reduces operating costs, and also produces higher-quality, finished forgings.

Careful metallurgical control of every process from ore mine to finishing mill at J&L assures the production of forging steels with the correct balance of properties you require.

Whether you produce rugged, heavy-duty forgings or lightweight, high-strength parts, J&L forging steels give the best results. Our staff of experienced metallurgists is available to help you establish the specifications to fit your need. Write or phone our nearest district office.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

J&L FORGING STEELS EXACTLY TO SPECIFICATION

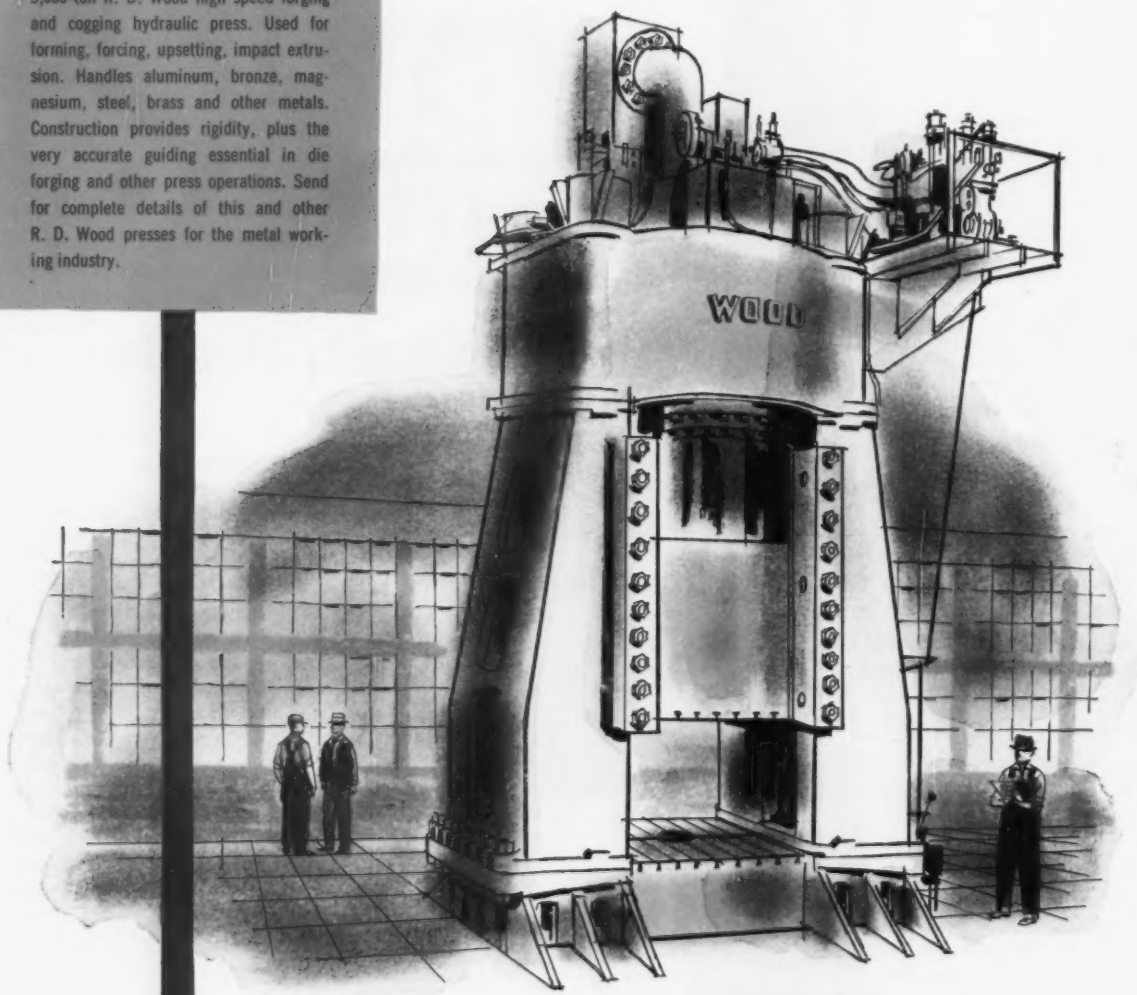
3,000-ton R. D. Wood high speed forging and cogging hydraulic press. Used for forming, forcing, upsetting, impact extrusion. Handles aluminum, bronze, magnesium, steel, brass and other metals. Construction provides rigidity, plus the very accurate guiding essential in die forging and other press operations. Send for complete details of this and other R. D. Wood presses for the metal working industry.

150 years of excellence

This is not an empty claim. It's a fact and a challenge.

In more than 150 years of service to industry, R. D. Wood's name has never appeared on a press of inferior quality.

You can *see* the proof of R. D. Wood quality in the precise design, select materials, and sound craftsmanship that distinguish our presses. And you can *see* the results of this quality in smooth, dependable performance, increased production, economical maintenance.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities

MAKERS OF HYDRAULIC PRESSES AND VALVES • FIRE HYDRANTS • CAST-IRON PIPE • GATE VALVES • GAS PRODUCERS • ACCUMULATORS

The Iron Age SALUTES

Donald Douglas

He went to California with $600 and began making planes. His first contract for a bi-plane marked the beginning of a long period of contributions to military and commercial aviation.

In 1920, Donald Douglas went to California and started building planes for himself. He was not yet 30, had $600 to play with.

In World War II, Douglas Aircraft accounted for one-sixth of the U. S. air fleet. The amazing growth indicated by this figure makes Mr. Douglas' story of special interest today, with atomic power certain to open up another industrial front.

Donald Wills Douglas was born April 6, 1892, in Brooklyn. He attended New York schools and the Naval Academy before taking up aeronautical engineering at Massachusetts Institute of Technology. He received a BS degree from MIT in 1914 and went to work for Glenn L. Martin as chief engineer in 1916. He designed the first Martin bomber, credited with broadening the concept of air attack.

In 1920, Mr. Douglas moved his family to California and started his own company. Within a few months, he had his first contract and built the Cloudster, a bi-plane that carried a payload equal to its own weight.

From that point on, the Douglas story shows up in large letters in any history of American Aviation. Douglas World Cruisers made the first flight around the world in 1924. In 1935, Douglas developed the DC-3, the twin engine airliner that made a name for itself in commercial use and turned up as the C-47, wartime workhorse. The Douglas DC-4 became the C-54 military transport in 1942 and showed the way for transoceanic travel by land-based planes. The DC-6 in 1946 and its later modifications was a Douglas contribution to long range passenger service. In 1953, the company introduced the DC-7, a piston powered transport with a top speed of over 400 mph. Douglas postwar defense production has included jet fighters, bombers and guided missiles.

Mr. Douglas is an active sportsman, goes sailing regularly. He enjoys fishing and small game hunting. He was awarded the Certificate of Merit for military production in World War II. During the war, he was president several times of the National Aircraft War Production Council. He has served as chairman of the Aircraft Industries Assn. board.

The Iron Age INTRODUCES

Theodore Operhall, appointed president, **Misco Precision Casting Co.,** Muskegon, Mich.; **Donald Harpold,** appointed plant manager; **Ajax Vartanian,** appointed plant superintendent; **Wayne Tice,** appointed plant engineer.

Charles R. Crowder, elected president, **Van Norman Machine Co.,** Springfield, Mass.; **Roger S. Pyne,** elected vice president; **T. W. Baush,** elected vice president; **R. W. Porter,** elected treasurer-secretary; **Samuel McCullough,** elected assistant treasurer.

Eric G. Orling, elected president, **Baker Castor Oil Co.,** New York.

Peter S. Pedersen, Jr., elected president, **Wonder Building Corp. of America,** Chicago.

John W. Raisbeck, appointed vice president, sales, Nash Motors Div., **American Motors Corp.,** Detroit, Mich.; **George L. Staudt,** appointed advertising manager, Hudson Motors Div.

Woodford D. Miller, appointed executive vice president, eastern operations, **Robertshaw-Fulton Controls Co.,** Greensburg, Pa.; **Frank H. Post,** appointed vice president, and general manager, Robertshaw Thermostat Div.; **George Mertz,** appointed assistant to general manager, manufacturing, Robertshaw Thermostat Div.; **Freeman G. Cross,** appointed general manager, The Fulton Sylphon Div.

John W. Craig, elected vice president and general manager, Electric Appliance Div., **Westinghouse Electric Corp.,** Pittsburgh.

John J. Giba, appointed vice president, Contracts Div., Arma Div., **American Bosch Arma Corp.,** Garden City, New York.

Arne O. Olson, elected vice president, engineering and procurement, Chemical Plants Div., **Blaw-Knox Co.,** Pittsburgh, Pa.; **Charles F. Hauck,** elected vice president, sales; **Edward S. Wright,** elected vice president, construction and estimating; **Keator McCubbin,** elected vice president, Midwest headquarters.

Walter C. Lok, elected vice chairman, **Gerity-Michigan Corp.,** Adrian, Mich.; **James J. Murtagh,** elected executive vice president.

William W. Nuernberg, elected treasurer, **Trion, Inc.,** Pittsburgh; **N. F. Eichelsbacher,** named vice president, manufacturing.

George B. Troup, elected vice president, **Lubri-Case Inc.,** New York.

Harry M. Clarke, appointed vice president, general manager, Detroit Plant, **Bliss & Laughlin, Inc.; James B. Landaker,** elected secretary and treasurer; **Bertil E. Anderson,** appointed manager, commercial research.

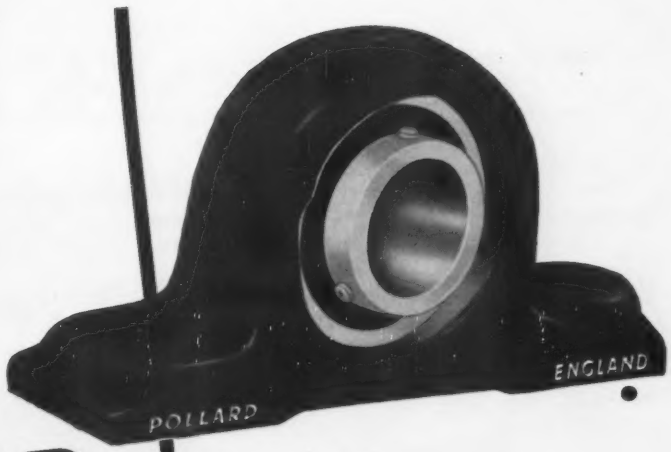
WILLIAM G. STEWART, elected president and chief executive officer, Universal-Cyclops Steel Corp., Bridgeville, Pa.

WILBERT A. WALKER, elected vice president and comptroller, U. S. Steel Corp., Pittsburgh.

L. C. SIMMONS, elected vice president, accounting, U. S. Steel Corp., Pittsburgh.

WILLIAM M. HAILE, appointed vice president, Linde Air Products Co., New York.

IT'S NEW IT'S POLLARD SELF-LUBE



BALL BEARING PILLOW BLOCK AND FLANGE UNITS

Self Aligning

Self Sealed

Self Lubricated

SUITABLE FOR ½" SHAFT DIAMETER TO 6" SHAFT DIAMETER IN $\frac{1}{16}$" STEPS.

The POLLARD "SELF-LUBE" sealed bearing design offers the MAXIMUM duty, for the MINIMUM of attention and outlay. It can be stated that 90% of bearing failures are due to the ingress of foreign matter, and by reason of the great strides which have been made in the manufacture of special lubricants, it has been possible to provide a bearing mounting requiring no servicing whatsoever. The one piece housing and solid sleeve, enables the bearing to be fitted as a complete unit, thereby eliminating the hazards of an exposed bearing. Further, the improved sealing devices are of the flexible type bonded to a metal insert, ensuring long trouble free service and are not called upon to align themselves to the malalignment of the bearing housing. This bearing unit gives a life equal to, or greater than, the standard open type bearing of similar size, periodically lubricated, and is available from ½" to 6" shaft diameter. Flange units incorporating the same advantages as outlined above are also available. The lower drawing illustrates the flange unit design. Catalogue SL/2/55, giving further details, is available on application to Room B.2, Technical Sales Dept., London, England, or Montreal.

John H. Wall, appointed executive vice president, **Servel, Inc.,** Evansville, Ind.

F. A. Davis, appointed supervisor, orders, Martins Ferry, **Wheeling Steel Corp.,** Ohio.

J. B. Fisher, named manager, Special Products Div., **David Round & Son, Inc.,** Cleveland; **William L. Tanksley,** appointed chief engineer; **Louis E. Franchally,** appointed director, purchases.

Arthur E. Russert, appointed assistant general sales manager, Strip Steel Div., **Acme Steel Co.,** Chicago.

Harold Meyer, appointed district sales manager, **Universal Atlas Cement Co.,** Milwaukee, Wis.

Edward Beattie, appointed district sales manager, Chicago, **Stauffer Chemical Co.,** New York.

Dr. John D. Kleis, appointed manager, Electrical Contact Div., **Fansteel Metallurgical Corp.,** Chicago.

Lee Wilson, appointed manager, Air Compressor Div., **Bell & Gossett Co.,** Morton Grove, Ill.

Charles H. Hallett, appointed manager, **Joseph T. Ryerson & Son, Inc.,** Wallingford, Conn.

Robert L. Smith, appointed manager, Chicago district sales office, **Wheeling Steel Corp.,** Wheeling, W. Va.

Dwight L. Wardell, appointed advertising manager, **Sandoz Chemical Works, Inc.,** New York.

Richard H. Ewert, appointed manager, gearing sales, **Foote Bros. Gear and Machine Corp.,** Chicago; **Theodore C. Beug,** appointed advertising manager, Industrial and Precision Div.

JAMES F. ACKERMAN, appointed vice president, The American Brass Co., Waterbury, Conn.

WILLIAM C. KNOEPPEL, appointed vice president, Torrington Div., The American Brass Co., Waterbury, Conn.

FRANK H. BALLANTYNE, appointed vice president, French Small Tube Div., The American Brass Co., Waterbury, Conn.

SCOTT H. PATTERSON, appointed vice president, Buffalo Div., The American Brass Co., Waterbury, Conn.

Another of the Reasons Behind Brad Foote Quality—

TOOTH SPACING

• 99% of gear drawings do not specify tooth spacing. For most applications, industry generally believes that competent gear manufacturers, working by standard AGMA practices, will produce gears within the limitations required for easy assembly and good load transmission.

• Occasionally, however, on very precise jobs you may find it necessary to specify extreme accuracy of tooth spacing and nonadjacent tooth spacing. Applications such as radar mounts, timing mechanisms, indexing mechanisms—all may require closer tooth spacing tolerances than are obtainable with average equipment in the hands of regular gear manufacturers.

• BRAD FOOTE welcomes precision jobs like these. We can add to highly specialized equipment specific experience in meeting this, as well as many other demanding requirements for special gear production.

• Prove to yourselves the savings that BRAD FOOTE quality can mean. Let us quote on the gear requirements for your next program.

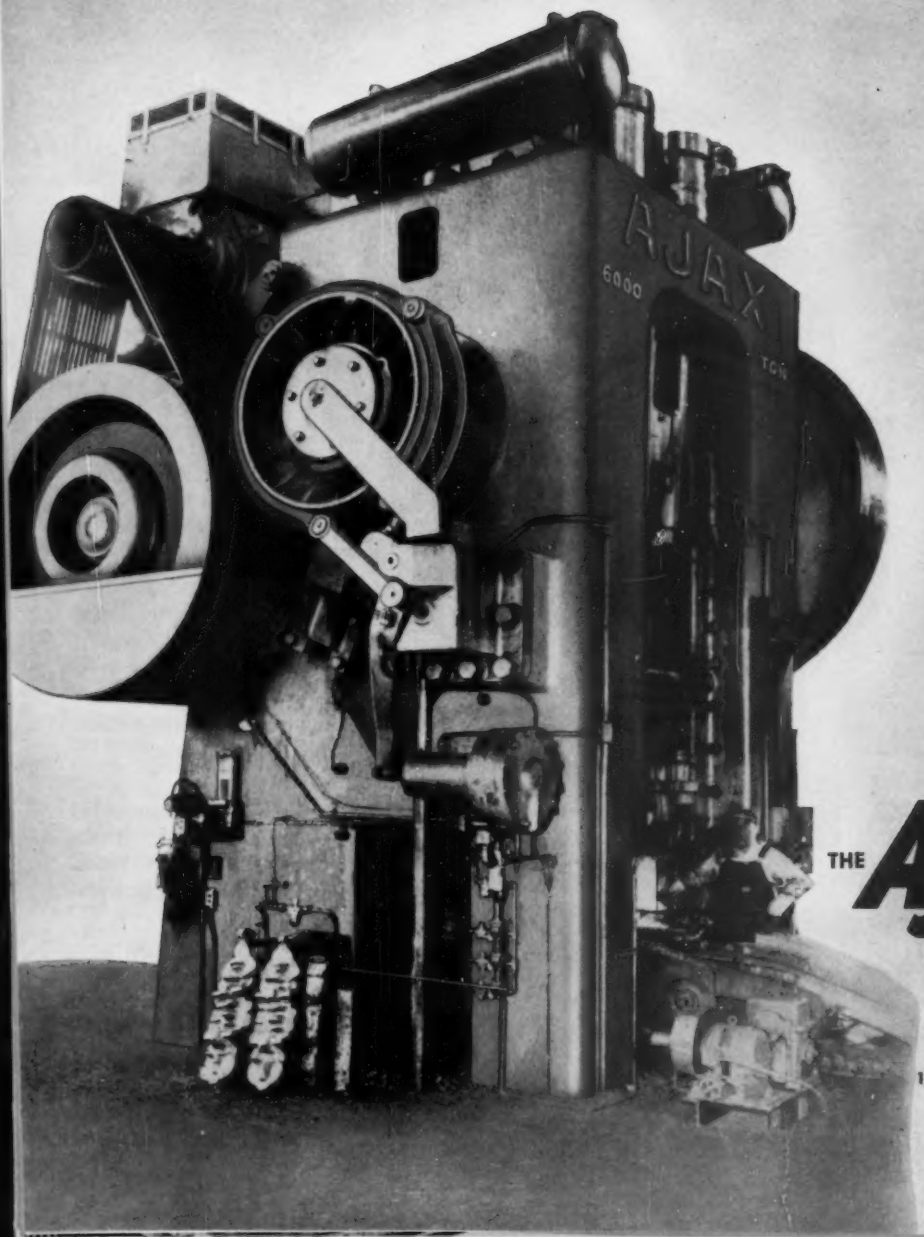
BRAD FOOTE MAKES ALL TYPES OF GEARS—
IN A COMPLETE RANGE OF STYLES AND SIZES

BRAD FOOTE GEAR WORKS, INC.

1309 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • OLympic 2-7700 • TWX CIC-2858-U

subsidiaries | AMERICAN GEAR & MFG. CO. Lemont, Illinois Phone Lemont 920 | PITTSBURGH GEAR COMPANY Phone SPalding 1-4600 Pittsburgh 25, Penn.

High Production of Automobile Crankshaft Forgings on AJAX *High Speed* Forging Presses



Production More than Doubled Over Former Methods on 6000 Ton Ajax Forging Presses

Crankshafts With Less Draft on Counterweights for Lower Machining Costs

For Your Forging Needs . . . Ajax Forging Presses Sizes 300 Ton to 8000 Ton

THE **Ajax** MANUFACTURING COMPANY

CLEVELAND 17, OHIO

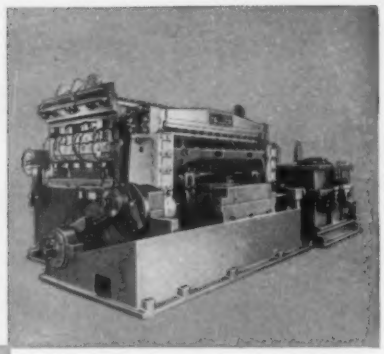
110 S. DEARBORN ST., CHICAGO, ILL.

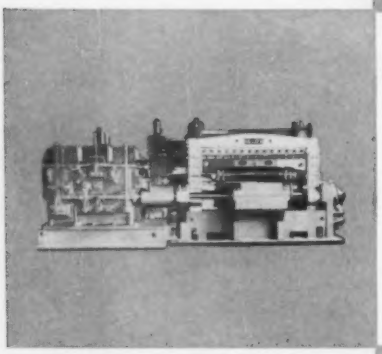
W. P. WOOLDRIDGE CO.

1209 BURLINGAME AVE., BURLINGAME, CAL.
6440 FLEET ST., LOS ANGELES 22, CAL.

Write for Bulletin 75 C

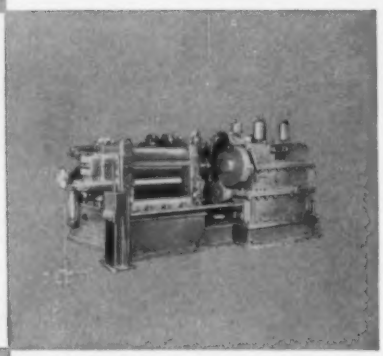
flexible design

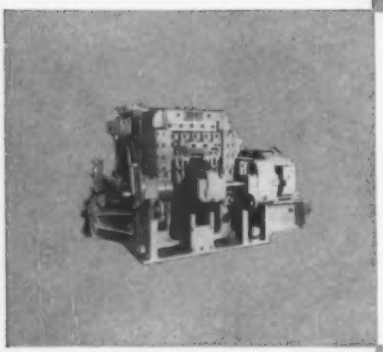




cutting accuracy

continuous feed





rugged construction

Automatic Shears

by HALLDEN

"the shearing specialists"

THE HALLDEN MACHINE CO.

THOMASTON, CONNECTICUT

Sales Representatives

The Wean Engineering Co., Inc., Warren, Ohio (Ferrous)
T. E. Dodds, Pittsburgh, Pa. (Non-Ferrous)
W. H. A. Robertson & Co., Ltd., Bedford, England (Ferrous & Non-Ferrous)

John W. Todd, Jr., appointed general manager, sales, Tennessee Coal & Iron Div., **U. S. Steel Corp.**; **Roy C. Rhodes,** appointed assistant general manager, sales, eastern area.

John H. Scherer, appointed division manager, sales, Can Div., **Crown Cork & Seal Co.,** Philadelphia.

Donald G. Sturges, appointed manager, New Products Branch, Research and Development Div., **The Carborundum Co.,** Niagara Falls, New York.

Frank D. Jackson, named sales manager, Pressed Steel div., **Motor Wheel Corp.,** Lansing, Mich.; **Anson Grimes,** appointed sales manager, Merchandise Div.

Luke E. Jacobs, appointed district manager, Cincinnati office, **SKF Industries, Inc.,** Philadelphia; **G. E. Mayhew,** appointed assistant district manager, Cleveland.

R. K. Grobholz, appointed manager, Power Pump Sales Div., **Worthington Corp.,** Harrison, New Jersey.

G. Reagh Atkinson, named manager, Honing Stone Div., **Mid-West Abrasive Co.,** Owosso, Mich.

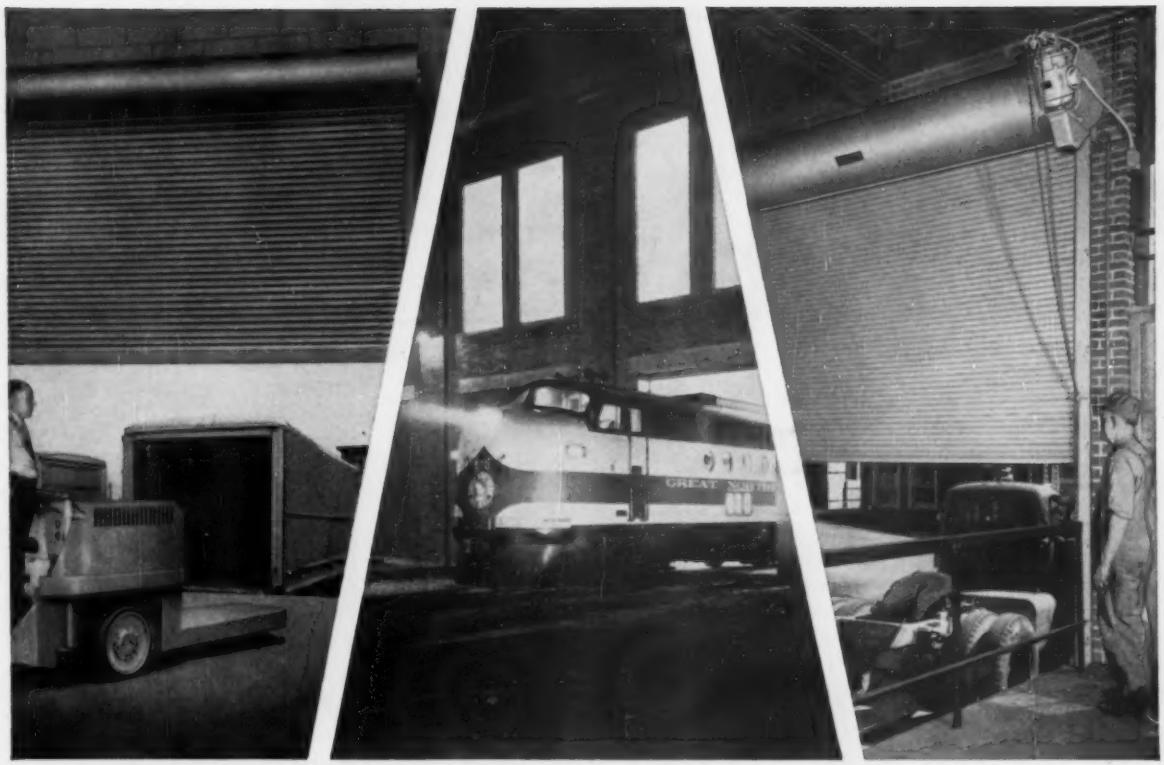
Kenneth M. Kraska, appointed district manager, West Coast, **Formsprag Co.,** Los Angeles.

Thomas B. Spoehr, appointed general manager, Aviation Div., **Pheoll Mfg. Co.,** Chicago.

George B. Morgan, appointed manager, Fresno branch, **Drake Steel Supply Co.; Albert H. Weinert, Jr.,** named secretary, Los Angeles.

OBITUARY

Theodore Trecker, 87, honorary chairman of board and founder of **Kearney and Trecker Corp.,** Milwaukee, Wis.



Cut "In-And-Out" Handling Costs with KINNEAR Steel Rolling Doors

In your search for proved ways to cut costs and speed up operations, have you considered the gains you can make "door-wise"?

For example, Kinnear Doors *save time* by clearing the entire opening in a single, easy, upward action. Then they *stay out of the way,* coiled compactly overhead, until closed.

In addition, all floor and wall space around a Kinnear Rolling Door is *fully usable at all times.* You can stack "mountains" of materials close inside or outside the door curtain — ready for fast, through-the-door handling by the shortest route.

And because ceiling space is always clear *above* Kinnear Rolling Doors, you get more efficient use of cranes, hoists, conveyors, and other handling equipment. In fact, Kinnear Rolling Doors can be equipped to open and close *around* crane or hoist rails that run right through the doorway.

Rugged all-metal construction plus heavy galvanizing* give Kinnear Rolling Doors extra ability to stand up longer under hard, daily use—through all kinds of weather. And you get more protection against fire, theft, intrusion and vandalism with Kinnear Rolling Doors.

Kinnear Doors are built to fit any new or old doorway. Electrical, manual or mechanical operation to meet *your* need. Write for full information.

*(with 1.25 oz. pure zinc per sq. ft. of metal, ASTM standard)

Kinnear RoL-TOP Doors (Sectional-Type) Are Also Available

The catalog on top describes Kinnear RoL-TOP Doors, of rugged, heavily galvanized steel sections, hinged horizontally (available also with wood sections). The other book gives full details on Kinnear Steel Rolling Doors, featuring the interlocking steel-slat curtain and coiling upward action. Send for these illustrated bulletins!

The KINNEAR Manufacturing Co.

FACTORIES:

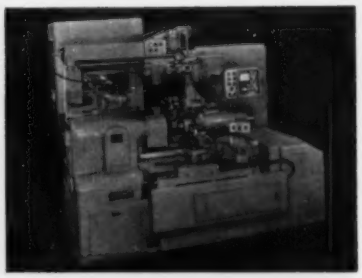
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 221 or 222

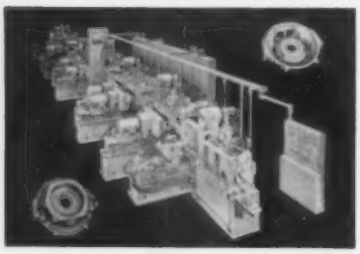
Hydraulically-actuated loader provided for lathe



Incorporating a gravity chute and a shuttle conveyor designed to hold a supply of rough workpieces to be machined on the lathe, a new hydraulically-actuated loader automatically positions each of these pieces between the work centers of the machine, triggers a programmer controlled four cut automatic work cycle of the lathe and finally removes each finished piece from the lathe when the desired cuts are completed. No manual control of either the automatic loader or the lathe is required for this operating sequence. *Monarch Machine Tool Co.*

For free copy circle No. 1 on postcard p. 221

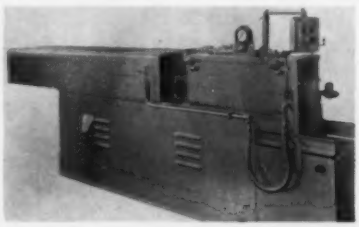
Transfer machine makes two housings at once



Designed to eliminate the need for machining, then assembling and again machining flywheel housing assemblies, a new transfer machine processes two different types of flywheel units for two different makes of car engines. The 20-station machine rough and finish turns and faces the engine and transmission mounting faces; drills, bores, chamfers, reams and taps all holes; assembles the center bearing and dowels. It also finish bores and washes and dries parts, plus other vital operations. *The Cross Co.*

For free copy circle No. 2 on postcard p. 221

Portable unit descales billets in 2 seconds



Portable, self-contained, and semi-automatic in operation, a billet descaler is reported to process a 32 in. long billet in less than 2 seconds. This descaler has been designed for universal application in all forging operations. It handles billets up to 32 in. in length and up to 6 in. in diameter. It can be operated with either side or end feeding. *American Steel Foundries.*

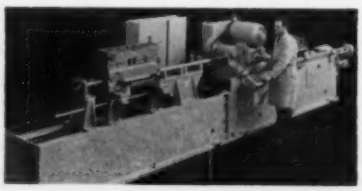
For free copy circle No. 3 on postcard p. 221

Tube straightener provides high speed tempering

A rotary straightener will straighten hard tube, give a light temper to soft annealed tube and bring ovaled tube back to perfect roundness. Lengths of copper tube to be tempered are straightened before annealing. After annealing, a single pass through the machine produces final straightness and roundness, plus light-temper hardness. Unit straightens hard-drawn copper at rates up to 125 ft per minute. *E. W. Bliss Co.*

For free copy circle No. 4 on postcard p. 221

Tool furnishes accuracy in aligning engine bearings

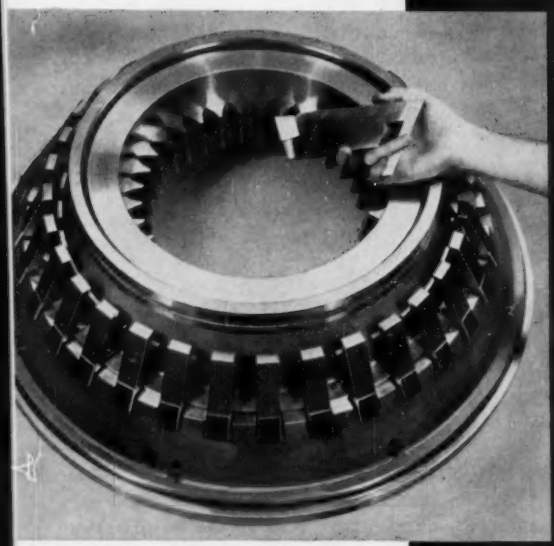


A microhoning tool, used to generate accuracy and alignment in the main bearings of a diesel engine block, has nine banks of plastic guides and one bank of abrasives which are automatically expanded by one cone. As the tool is reciprocated, it is piloted and stabilized by the guides. Bores are microhoned in perfect alignment. *Micromatic Hone Corp.*

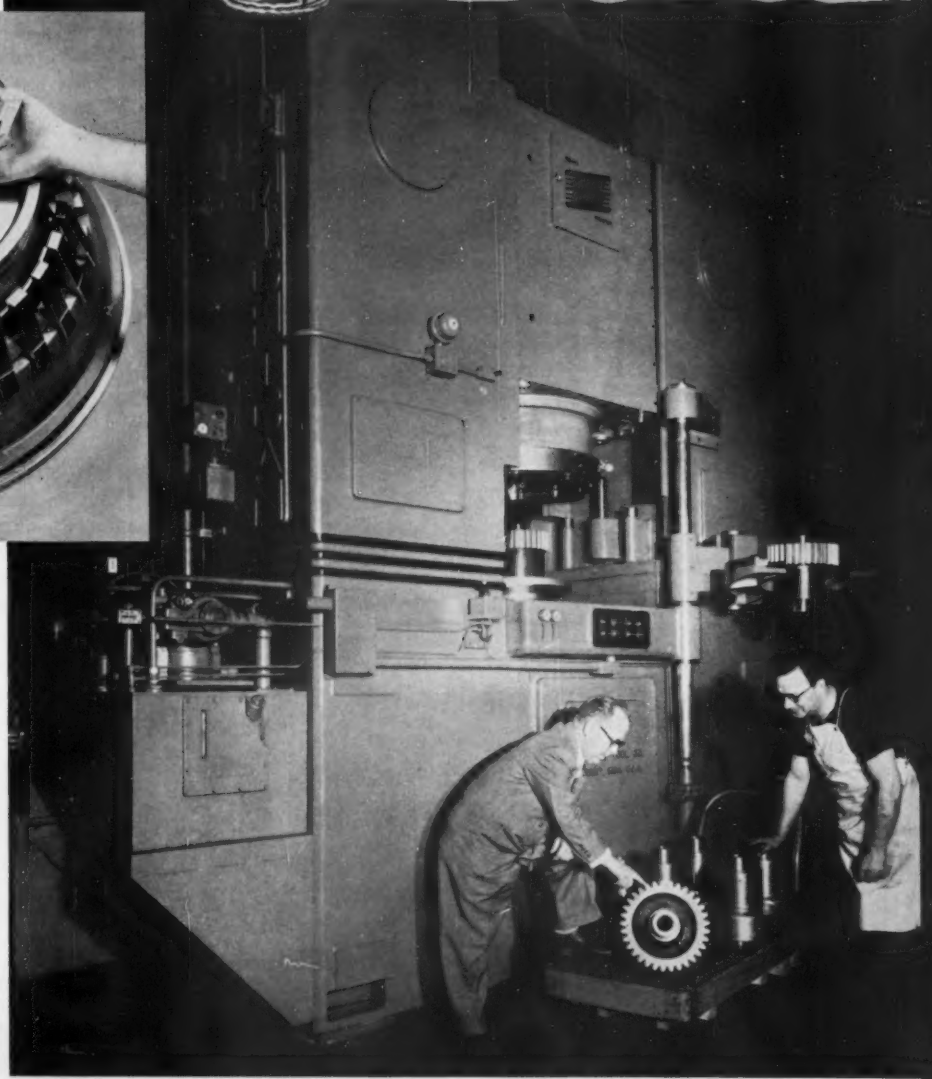
For free copy circle No. 5 on postcard p. 221

This Month's

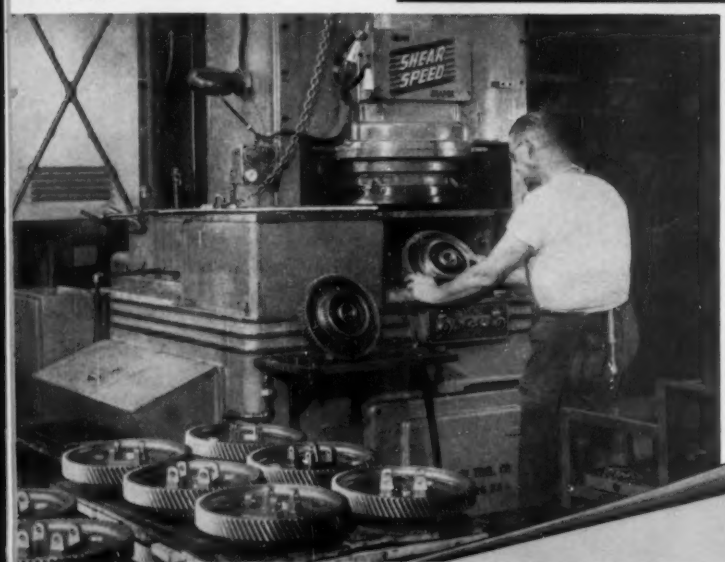
GEAR PIX



▲ RUGGED ACCURACY is built into this SHEAR-SPEED tool holder used to cut the 33-tooth bull gear in 6½ minutes on the new giant SHEAR-SPEED.



▼ VERSATILITY—Shoulder gear (7.25" dia. x 1" face) being formed on this 18105 SHEAR-SPEED gear shaper at the rate of 23 per hour, is one of 12 different tractor gears regularly produced on this fastest of gear cutting machines.

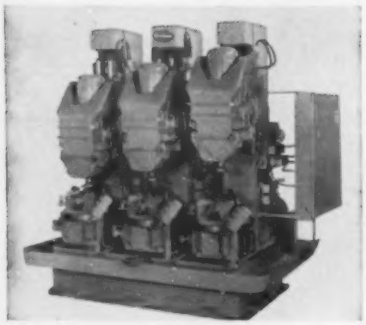


▲ VERITABLE GIANT is this new SHEAR-SPEED gear shaper. Cutting time on the tractor bull gear shown is 6½ minutes compared to 3 hours by former methods. New bulletin describes the two new SHEAR-SPEEDS with capacities up to 6" face width, 13" and 20" maximum diameters.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.



Unit provided to finish mill clutch ring lugs

With a new 3-column, triple-head milling machine it's possible to finish mill all 3 slotted lugs on an automotive clutch ring, and hold them in the same plane with absolutely no variation, because all milling on a single clutch ring is done by the same horizontal cutting tool. The miller features 3 vertical feed units, mounted in battery on a single base, and 3 index tables, with 3 work stations on each head. Each feeder is equipped with a horizontal cutting tool. Each index table is cycled to mill in turn each of the 3 lugs. Machine is completely automatic, except for loading and unloading, which requires one man. *Michigan Drill Head Co.*

For more data circle No. 6 on postcard p. 221

Transducers available for ultrasonic metal cleaning

A line of hermetically sealed power transducers is suited for ultrasonic metal cleaning applications such as the removal of buffing compounds, radioactive contamination, soldering flux, plaster or carbon smut. Also may be used for liquid processing such as plating, pickling and descaling. *Branson Ultrasonic Co.*

For more data circle No. 7 on postcard p. 221

New clamp simplifies welding of heavy plates

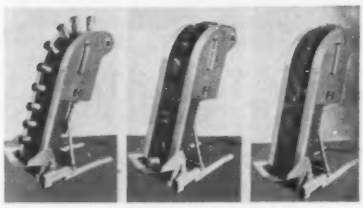
A lightweight, self-contained unit, combining a powerful magnetic base and a fast operating jack is designed to aid welding operations. In butt welding, the clamp is placed with the jack over the warped plate. When current is turned on, finger tip turns of the lever bring perfect alignment. Both hands are free to complete weld. *Portomag Sales, Inc.*

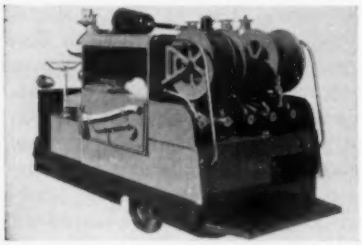
For more data circle No. 8 on postcard p. 221

Space-saving elevator-conveyor for ferrous parts

A permanent magnetic elevator-conveyor for automated handling of items such as cans, nails, bolts, blanks, finished parts and scrap is designed to operate with efficiency even under tight space limitations. Extended transition section permits easy discharge into carts, pallets or bins. Bed is curved on a radius of 15 in. to handle objects with high centers of gravity. *Eriez Mfg. C.*

For more data circle No. 9 on postcard p. 221





Plant fire truck has four fire-fighting methods

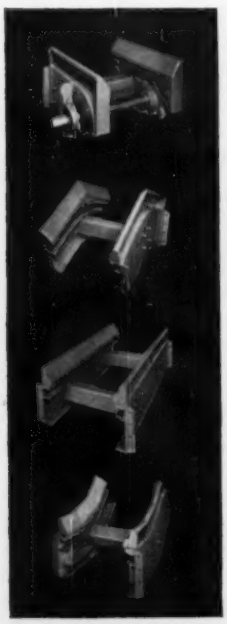
Making available a large volume of extinguishing agents in any part of a plant in a brief time, this unit has a speed of 15 miles per hr. It carries carbon dioxide, dry chemical, water and foam. Turning radius for the unit is 96 in., with a 50 in. width and a 68 in. height. A 15 cu ft accessory cabinet is included as well as an extension ladder. Standard equipment also includes hoses for water fog and CO_2. *Seco Safety Products Co.*

For more data circle No. 10 on postcard p. 221

Personnel carrier for plant tours and trips

Recommended for plant tours and for intraplant movements, a new truck has a capacity of 2000 lb with a deck 54 in. long x 40 in. wide, while being only 9½ in. off the floor. Its top speed is 6 mph with a capacity load. For plant tours, 4 removable air cushion seats are furnished. With these seats removed, the carrier can be used for freight deliveries. Since all controls for the 3 speeds and braking are on the floor, the operator's hands are free for maneuvering. Another use for the unit is in servicing vending machines. *Lewis-Shepard Products, Inc.*

For more data circle No. 11 on postcard p. 221



Now you can buy CUSTOMIZED conveyors in pre-fabricated STANDARD sections

In a **single glance,** you can see all of the advantages of MAY-FRAN STANDARDIZED components.

The five standard sections shown can be assembled to form virtually any type of *"customized"* conveyor for the handling of stampings, formed metal parts, forgings, automotive scrap, chips and turnings.

Straight sections . . . concave or convex sections . . . take-up charge and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

A single glance at the MAY-FRAN conveyor standardization program, and you will see savings never before possible. In addition you will see unsurpassed conveyor flexibility.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is **FIRST** again with *standardized* components for your *customized* installation.

Write today for complete information.

. . . AUTOMATION . . . . . AND YOU!

6699-MF

MAY-FRAN ENGINEERING, INC.

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FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Stamping presses

A complete line of autofeed presses for high-speed production stamping with progressive dies is described and illustrated in a new catalog. Presses covered in the catalog are in capacities ranging from 50 to 800 tons. Complete specifications include: ton capacity, stroke, spm range, shutheight, bolster size and thickness, bed opening, foot to bed height, slide adjustment, distance between uprights, horsepower, hand adjustment of slide, vertical upright opening, front-to-back upright opening and other significant dimensions. *Danly Machine Specialties, Inc.*

For free copy circle No. 12 on postcard p. 221

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 221.

Colloids

How "dag" dispersions of colloidal graphite and molybdenum disulfide can be used in a variety of metalworking operations is described in Bulletin No. 426 just published. One of the products, "dag" Colloidal Graphite, is discussed as especially effective in forging, wire drawing, extrusion, piercing, punching, deep-drawing, stretch-forming, spinning, cutting, machine lubrication, and press fitting, because of its excellent lubrication qualities and high resistance to heat. Bulletin No. 426 details methods of application, and the contribution of such products to metalworking operations. *Acheson Colloids Co.*

For free copy circle No. 13 on postcard p. 221

Office duplicating

A case history brochure on the use of xerography illustrates and describes how office forms, standard practice bulletins, reports and letters, engineering drawings, traffic invoices, and others are reproduced quickly and economically. *The Haloid Co.*

For free copy circle No. 14 on postcard p. 221

Gears

"How to Assemble Cone-drive Double Enveloping Gears," is the title of a 12-page bulletin which uses text and pictures to explain the use of center distance, side position and end position dimensions of the gear sets in locating them within the housing. Both small and large scale production applications are covered. *Cone-Drive Gears Div., Michigan Tool Co.*

For free copy circle No. 15 on postcard p. 221

Rebuilt lathes

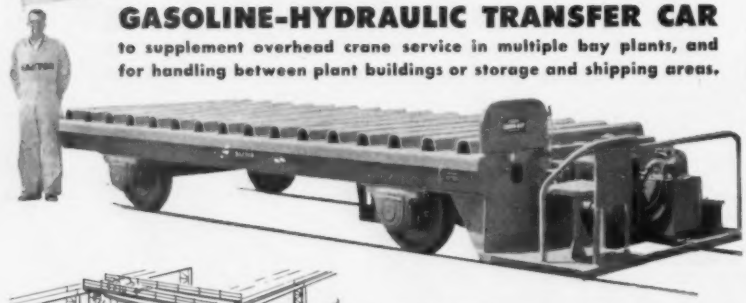
A new 12-page picture brochure shows how turret lathes are rebuilt and reconditioned in an east coast plant. The brochure's photographs cover step by step operations from the time a worn machine is received in the shop until it is restored and ready for reinstallation. Picture captions describe the various rebuilding operations in detail. *De Silvey Corp.*

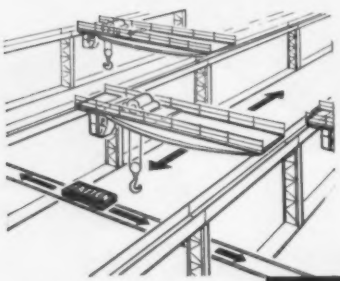
For free copy circle No. 16 on postcard p. 221

New CROSS-BAY®

GASOLINE-HYDRAULIC TRANSFER CAR

to supplement overhead crane service in multiple bay plants, and for handling between plant buildings or storage and shipping areas.





CUSTOM-BUILT to meet speed and capacity requirements. Special superstructures can be designed for specialized or mechanized handling. The car illustrated, built for steel warehouse work, provides capacity of 25 tons plus 50% for impact loading, and two-way speed of 50 feet per minute. Other capacities available.

A-1048

CROSS-BAY cars may also be powered by electric motor, electro-fluid drive, gasoline-electric drive, or storage battery. Capacities from 5 to 500 tons. Custom-built.

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

FREE TECHNICAL LITERATURE

Tramrail data

A new completely revised Engineering and Application Booklet has been issued. The booklet describes in considerable detail stresses developed in various type tracks used for overhead materials handling systems. The problem of track peening and its solution is also covered. Data is given on the principal components used for tramrail systems. Many illustrations show the equipment serving a wide variety of operations. *Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.*

For free copy circle No. 17 on postcard p. 221

Granite surface plates

A new technical manual which fully describes the manufacture of black granite surface plates and precision inspection accessories is now available. This illustrated, 67-page technical manual answers questions about the product; tells how granite surface plates are made and how they are lapped down to fifty millionths overall accuracy. *Collins Microflat Co.*

For free copy circle No. 18 on postcard p. 221

Free machining bar

A new 20-page brochure describes a newly developed, high strength, free machining bar. Containing 29 pictures and tables, the brochure discusses the product's advantages which are reported to include: high strength without heat treating; ease of machining; elimination of heat treating problems; increased wear resistance; minimum distortion; higher fatigue resistance; and uniform quality. Tables give the representative chemistry and physical properties of the product. *La Salle Steel Co.*

For free copy circle No. 19 on postcard p. 221

Mechanical tubing

The design and fabricating advantages obtained through the use of alloy steel tubing are presented in a 4-page folder. Information on points to consider in selecting tubing; the technical literature available on the subject; and tube types and specifications are given. *Babcock & Wilcox Co.*

For free copy circle No. 20 on postcard p. 221

NOW ...Wire of High Finish for Electroplated Products in Many Shapes & Sizes

Bright, Smooth No. 3 Finish takes Plating Beautifully—Adds Eye-Appeal to Your Products

Continental's new technique for producing #3 finish flat and special shaped wire offers you a range of standard and special wire shapes with a satin smooth finish for electroplating purposes. Previously, only flat wire with a surface suitable for high polish electroplating was obtainable...but now from Continental you can specify #3 finish in flat, square, rectangular, oval, and other shapes on inquiry, in practically any size, temper, and analysis in low carbon and medium low carbon steels. (Note—some sizes of above shapes require special tooling before they can be produced.) Here is extra "eye-appeal" for moldings, product trim, or wherever a formed plated wire component is required. Send us a blueprint of your part, or mail the coupon today.

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Gentlemen: Please send us complete information concerning the new Continental #3 Finish Wire for Electroplating.

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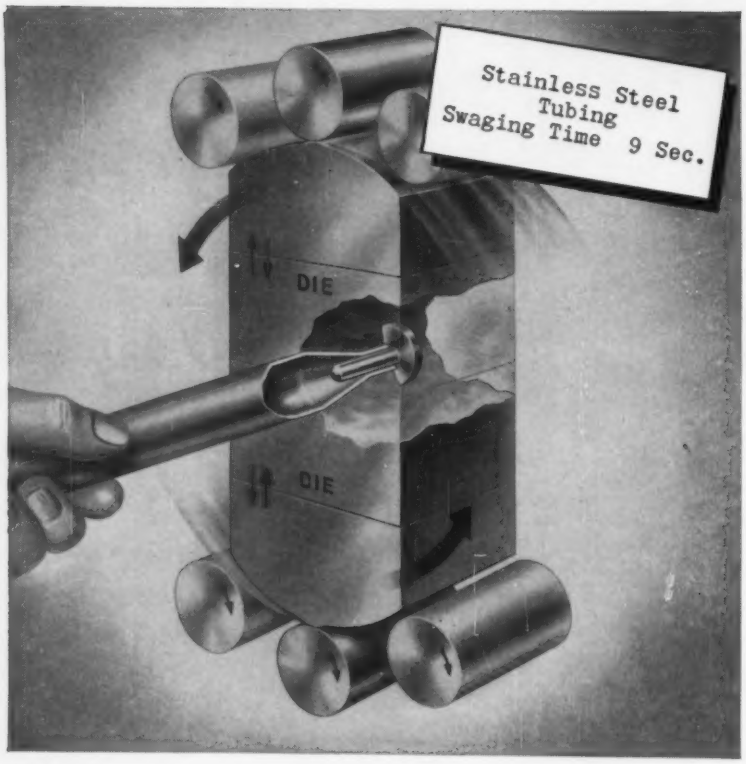
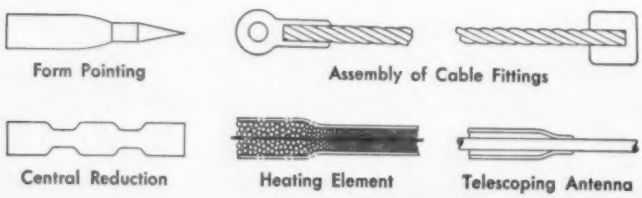


You save several machining and finishing operations with rotary swaging

You also save time, material and labor costs . . . greatly increase output . . . in a variety of pointing, tapering, reducing, sizing, forming and assembly operations.

SOME SWAGING EXAMPLES



Check with Fenn for engineering advice on swaging your product or parts.

FENN

Precision Rolling Mills — Turks Heads — Wire Shaping Mills
Swaging Machines — Wire and Tube Drawing Machines

The Fenn Manufacturing Company, 317 Fenn Road, Newington, Connecticut

Aluminum bronze alloys

"Premuim Quality Aluminum Bronzes," is a 32-page booklet of basic information on the properties, composition and functions of aluminum bronze alloys as furnished in sand, centrifugal, investment and permanent mold castings, hammer forgings and heat-treated and machined parts. Complete engineering data on each grade of a company's aluminum bronze is contained in a 17-page section. A specification index chart identifies these grades with various government and technical societies' specifications. Also included are 6 pages of drawings and tables of machining recommendations. *W W Alloys, Inc.*

For free copy circle No. 21 on postcard p. 221

Grinders, drillers

A new catalog covers a company's complete line of tool post grinders, hand grinders, automatic drilling equipment, drill grinders and accessories. The 40-page booklet is printed in 2-colors and contains many technical and application illustrations. In addition, there are several handy charts for calculating the proper accessories for various types of grinding machines and operations. *Dumore Precision Tools.*

For free copy circle No. 22 on postcard p. 221

Trackwork items

Catalog of 134 pages describes and illustrates fabricated crossings, frogs, switches and many other trackwork accessories. Also included is a reference section containing handy mathematical, trigonometric and conversion tables —information of great use to anyone who works with, or buys trackwork. *United States Steel Corp.*

For free copy circle No. 23 on postcard p. 221

Limit switch

A new automation limit switch which electrically controls functions of machine tool and press auxiliary equipment is described in a new bulletin just released. The bulletin describes operating features of the switch and its component parts, and shows blueprint diagrams of construction. *E. W. Bliss Co.*

For free copy circle No. 24 on postcard p. 221

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 218

Special processing

A special service to the metallurgical industries—the production and processing of made-to-order metals in experimental quantities—is described in a 16-page booklet. Entitled "Precision Metals Services," the illustrated booklet discusses the facilities of the company's pilot plant for producing small (10-lb) ingots by regular or vacuum melting, and for forging, annealing, heat treating, rolling and drawing the resultant metal. The booklet also includes a list of other special metal producing and processing functions which the service will provide. *Allied Products Div., Hamilton Watch Co.*

For free copy circle No. 25 on postcard

Shearer, former

Literature is available on a new model universal shearing and forming machine for maintenance departments. The machine works mild steel up to 9/32 in. and features 8 different stroke lengths for versatility. It is recommended for straight, circle, irregular and inside cutting, as well as joggling, beading, louvering, dishing, edge bending and flanging. *American Pullmax Co.*

For free copy circle No. 26 on postcard

Spring stresses

A third series of selected data sheets, dealing with basic considerations in the design of precision springs, is offered. Residual stresses, stress concentration, design stress, fatigue life and the effects of elevated temperatures are discussed and illustrated in the 10-pages of 2-color data sheets, designated "Section 1A." *Hunter Spring Co.*

For free copy circle No. 27 on postcard

Flattening mills

A new 12-page illustrated booklet gives details on a wide range of 2-high wire flattening mills and their auxiliary equipment. The booklet points out that this equipment is designed for specific applications in flattening ferrous, nonferrous and clad metal wire in diameters from a few thousandths of an inch up to 1 inch at speeds approaching 3000 fpm. It shows a variety of single and multiple stand mills built by the company's machinery division. Mill construction features covered in the text include: rolls, housings, screwdown, universal joints, drive and lubrication. *Waterbury Farrel Foundry & Machine Co.*

For free copy circle No. 28 on postcard

Cleaner

Information is available on Kesonic, an emulsion cleaner for the removal of oily soil and greases. The product is used for routine cleaning of aircraft, ship bunkers, trucks, automotive, railroad equipment, and heavy machinery, and for marine use where removed soil is held in stabilized emulsion even when mixed with sea water. *Kelite Corp.*

For free copy circle No. 29 on postcard

Steel tape

A new technical data sheet has been released on a plastic covered steel tape. According to the new literature, this plastic-jacketed steel strap lends itself to applications where metal strap or various kinds of tape are employed. The data sheet describes various uses of the product in addition to its physical properties. *The Garrison Co.*

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Electroplating controls

A comprehensive technical bulletin on temperature controls for degreasing, cleaning, pickling, electroplating and chemical dip coatings gives recommendations for all types of metals and processes. Diagrams are given for the various types of systems. *Taylor Instrument Companies.*

For free copy circle No. 31 on postcard

Hydraulic presses

Four column down-acting hydraulic presses from 25 to 200 tons are described in a 4-page bulletin. Accompanying engineering data sheets give full specifications and dimensions for each model. The presses are adaptable to metal forming and drawing, plastics and rubber molding, laminating, die cutting, assembling, die try-out, pressing or to any application that requires precise control. *K. R. Wilson, Inc.*

For free copy circle No. 32 on postcard

Colloids

A newly revised 4-page booklet, listing 42 colloidal and semi-colloidal dispersions for the metalworking, foundry, and related industries, has just been issued. These products include dispersions of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, and acetylene black. Carriers and diluents are given for each product, along with typical applications and important physical data. On the list is 'dag' Dispersion No. 224, a mica-and-water product for use as a metalworking lubricant (particularly for extruding aluminum) and as a dielectric coating. *Acheson Colloids Co.*

For free copy circle No. 33 on postcard

Grinding machines

Precision cylindrical grinding machines, exhibited by one manufacturer at the Machine Tool Show are illustrated in a new 20-page booklet. Included are photos and descriptions of integrated production lines, automatic grinders and standard machines. Sketches are used throughout the booklet to clarify the grinding operations. *Landis Tool Co.*

For free copy circle No. 34 on postcard

Liquid measure

Just issued is a new 8-page bulletin, 13-22, describing closed tank liquid level measurement and control with the Type 13 LA d/p Cell Liquid Level Transmitter. It shows that the Type 13 LA is essentially the same as the familiar force balance differential pressure flow transmitter, except that a simple range suppressor spring has been added to the basic mechanism. The spring balances out the effect of hydrostatic pressure in the piping line from the high point of the tank. In addition to diagrams showing principle of operation and suggested installation layout, the bulletin lists complete specifications and dimensions. Also included are illustrations of other liquid level components such as indicators, recorders and control valves. *The Foxboro Co.*

For free copy circle No. 35 on postcard

Electric furnaces

Bulletin 1054 describes a company line of electric furnaces and the organization's diamond block method of atmospheric control for hardening high speed steel. The furnaces pictured and described in the folder are additions to the firm's line to broaden the field of application for the units and provide an increased range of sizes and styles. *The Sentry Co.*

For free copy circle No. 36 on postcard

Aluminum skids

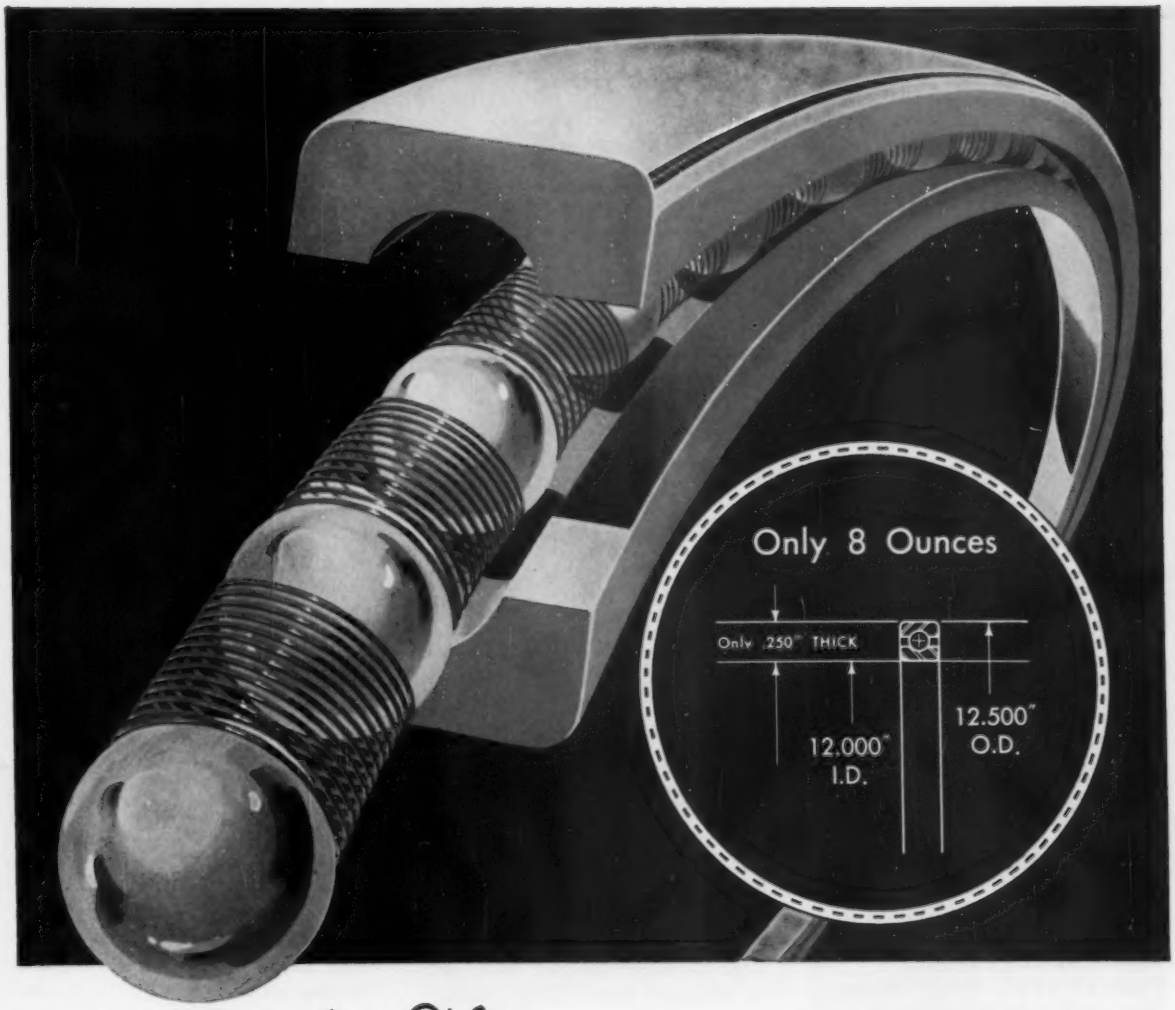
Design and construction features, assembly information and applications in handling operations are given for a line of aluminum skids in a 6-page folder. *Harvey Aluminum Div. of Harvey Machine Co.*

For free copy circle No. 37 on postcard

Electrical steels

A new and revised booklet of 28 pages on "Electrical Steel Sheets and Coiled Electrical Steel Strip" (Technical Bulletin EM 21) is now being distributed. This booklet gives up-to-date information on the electrical steels as well as detailed information as to gage, performance guarantees, and detailed graphs on various technical aspects of these steels. *Allegheny Ludlum Steel Corp.*

For free copy circle No. 38 on postcard



Reali-Slim... by Kaydon
world's thinnest radial ball bearing

HERE'S a typical example of Kaydon's *Reali-Slim* unique radial ball bearing that's finding wide application in practically every industry. *Reali-Slim* are the world's finest thin-section bearings and proportionately are thinner than a wedding ring. The bearing illustrated here is 12.000" I.D., 12.500" O.D., .250" thick — weighs less than 8 ounces. Designed for minimum weight and space limitations, it has a static load capacity of 5,520 lbs. and 894 lbs. at 100 rpm.

If you're looking for *Reali-Slim*, lightweight, radial ball or roller bearings, look at Kaydon's *Reali-Slim* line. Besides hundreds of standard *Reali-Slim* designs, there's a wide variety of special races, seals and separators to meet special bearing problems. What's more Kaydon is able to produce these *Reali-Slim*, high-precision bearings because Kaydon specializes in the unusual. In addition, Kaydon bearing engineers are prepared to give you valuable help with technical bearing application problems.

For complete data on *Reali-Slim* bearings for standard or special applications, ask for engineering Catalog No. 54RS-2.

Reali-Slim Ball Bearings — in Conrad, angular contact, 4-point contact and other types are available in seven standard cross sections from .250" to 1" and in bore diameters from 4" to 40".

Reali-Slim Roller Bearings — in radial or taper roller types are available in cross sections from 3/16" and in bore diameters from 5" to 40".

K-554

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

All types of ball and roller bearings — 4" bore to 120" outside diameter . . .

Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Ball Radial • Ball Thrust Bearings

State

Trade association executives are counting on another good year . . . Industries expand to catch up with demand.

REVIEW | FORECAST

Industry Leaders See Markets Holding Up

WHAT'S AHEAD?

Trade association executives report on outlook in these fields:

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Brass and Copper:

Early '56 will see more copper available . . . Mills to expand.

T. E. Veltfort
Manager
Copper & Brass Research Assn.

Many informed persons in the copper industry expect that there will be a balance between the supply and demand of copper during the first quarter of 1956. A few even believe there may be a slight surplus of supply over demand by the middle of the year. Naturally, these predicitions assume that there will be no serious strikes or other interruptions in production, such as occurred during the past two years.

This optimistic outlook is based on the fact that increased supplies of copper are expected to become available early in the year. Development of new mines and expansion of existing ones will bring an increasing amount of copper to the market. It is expected that output will increase month by month at least for the next three years.

The brass mill industry, faced with a growing demand for its products, is keeping pace with the construction of new plants, modernization of present facilities and the acquisition of new machines and equipment.

All predictions for industrial and construction activity in 1956 indicate that the high level of the past year will be maintained. The brass mill industry will be able to meet growing customer needs with an adequate supply of products.

Conveyors:

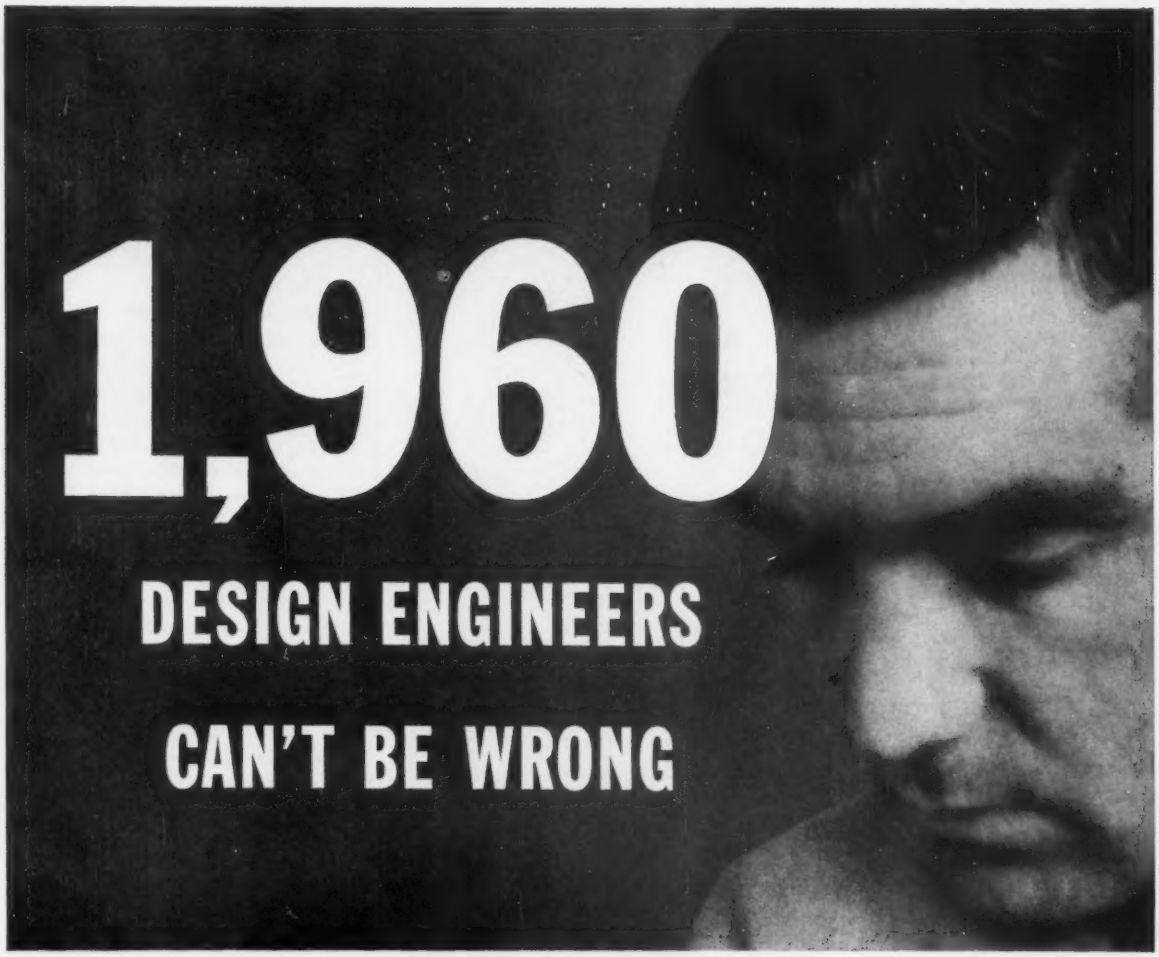
First half production will match $300 million rate of 1955.

R. C. Sollenberger
Executive Vice-President
Conveyor Equipment Manufacturers Assn.

The conveyor industry will move into 1956 with a backlog of orders assuring that at least the first six months will continue at the brisk 1955 pace of about 300 million dollars a year.

As to new developments, major emphasis may be placed on four:

1. Automation. There are few new conveyor installations that do not involve electronic controls, automatic feed-back systems, complex integration of conveyors with production machines and similar characteristics of automation. This trend is sure to continue and to be accentuated in 1956.



In 1,960 separate applications these men specified IPC packings

In the short space of 11 months, January-November 1955, IPC packings were specified for 1,960 varying applications. From a simple water pump to a highly complex retainer seal for an automatic transmission, IPC leather and synthetic packings met every design requirement!

IPC's engineering and laboratory staff analyzed all factors . . . carefully developed compounds and designed seals for each application. This is the attention to detail that ensures better packings . . . better performance.

Whatever your problem — specify IPC.

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Bristol, New Hampshire

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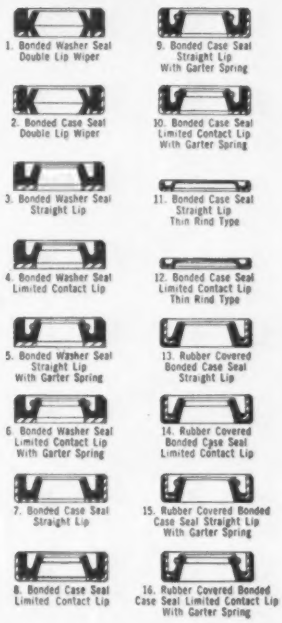
1. Bonded Washer Seal Double Lip Wiper
2. Bonded Case Seal Double Lip Wiper
3. Bonded Washer Seal Straight Lip
4. Bonded Washer Seal Limited Contact Lip
5. Bonded Washer Seal Straight Lip With Garter Spring
6. Bonded Washer Seal Limited Contact Lip With Garter Spring
7. Bonded Case Seal Straight Lip
8. Bonded Case Seal Limited Contact Lip
9. Bonded Case Seal Straight Lip With Garter Spring
10. Bonded Case Seal Limited Contact Lip With Garter Spring
11. Bonded Case Seal Straight Lip Thin Rind Type
12. Bonded Case Seal Limited Contact Lip Thin Rind Type
13. Rubber Covered Bonded Case Seal Straight Lip
14. Rubber Covered Bonded Case Seal Limited Contact Lip
15. Rubber Covered Bonded Case Seal Straight Lip With Garter Spring
16. Rubber Covered Bonded Case Seal Limited Contact Lip With Garter Spring

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P1

IMPROVE YOUR PRODUCT AND CUT COST . . . by letting Shenango handle all your annular, symmetrical or tubular part needs. They're centrifugally cast for pressure-dense grain, greater strength, better elongation and freedom from porosity, sand inclusions and blow holes. Machining is easy too, with less waste. Whether your plans call for tiny bushings or huge rolls, ferrous or non-ferrous, rough or finished, check with Shenango . . . and see how you stand to gain. Write: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (Executive Offices: Pittsburgh, Pa.)
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CENTRIFUGAL CASTINGS
COPPER, TIN, LEAD, ZINC BRONZES · MONEL METAL
ALUMINUM AND MANGANESE BRONZES · NI-RESIST · MEEHANITE METAL

2. Distribution. With rapidly rising labor costs the economies of mechanized production are being cancelled out by rising distribution costs. Distribution is almost entirely a materials handling problem, and savings comparable to those in mechanized production can be achieved.

3. Passenger Conveyors. The passenger conveyor is sure to grow in popularity and use. Installations such as in Jersey City, N. J., and Houston, Texas, have proved the practicability of the principle. What is most needed is recognition of the value of the idea by the public.

4. Long-Distance Conveyors. Another field in which there is a lag between the engineer and the public is long-distance transportation by conveyor belt. Already operating are installations of five miles or more in several countries and there is every reason to believe that the Riverlake Project for a 103-mile conveyor across the State of Ohio will eventually become a reality. There are no technical difficulties and there is ample economic justification.

Freight Cars:

'55 orders were best in 30 years . . . Steel shortage will hurt.

Lester N. Selig
President
American Railway Car Institute

A stream of orders from railroads in late 1955 sends freight car builders into the new year with one of the heaviest backlogs in history. But builders are unable to obtain readily the steel necessary to fulfill these orders expeditiously.

Although final figures are not yet available, new freight car orders in 1955 are expected to total around 161,800, the largest figure in more than three decades. Of this total, however, only 15,500

From left: Wyandotte Representative Paul A. Finn; G. L. Moyer, Shop Foreman; and J. L. Stringer, Lead Mechanic, check highly effective removal of dirt, paraffin, and oil from diesels with Wyandotte W.L.G. Stewart & Stevenson Services, Inc., one of the nation's largest distributors of General Motors Diesel Engines, also uses Wyandotte Phos-It for removing rust and preparing metal for painting; uses P-1075 to strip paint and "flock" from blower parts.

"Wyandotte W.L.G.* performs tough cleaning job where 20 other cleaners failed!"

— Stewart & Stevenson Services, Inc., Houston, Texas

"Our customers rely upon us for service and dependability," says Mr. G. L. Moyer, shop foreman, Stewart & Stevenson Services, Inc. "So when diesel equipment comes to us for repair or re-engineering, we look to Wyandotte products to meet our exacting engine and parts cleaning requirements.

"Of the 21 cleaning compounds we've tested in our large hot-immersion tank in the last two years, Wyandotte W.L.G. is the *only* one we found that would effectively strip such hard-to-remove materials as baked-on oils, paraffins, and dirt. It also cleans engines, crankshafts, and parts *in 75% less time*, and gives us 'tank life' of almost two months, even under our heavy cleaning loads. Our cleaning 'use costs' are the *lowest* they have ever been."

This is but one example of the many types of cleaning jobs that can be done with Wyandotte W.L.G. What about your cleaning needs? Long a recognized leader among cleaning products, W.L.G. is used as a heavy-duty soak cleaner in the porcelain-enamel industry, in metal-parts manufacturing plants, and in any application involving difficult cleaning jobs on ferrous metals.

Wyandotte manufactures a complete line of specialized metal-cleaning products. And Wyandotte service is prompt, accurate and thorough. Call in a Wyandotte representative and talk over your metal-cleaning problems with him, today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.* *REG. U.S. PAT. OFF.

Wyandotte
CHEMICALS
J. B. FORD DIVISION

SPECIALISTS IN METAL-CLEANING PRODUCTS

LOOK TO WILLSON
for another new development in head protection!

NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS

FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

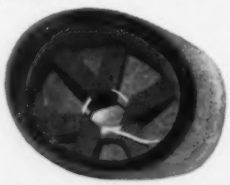
Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

Strongest Made!

See how it's built up from 24 individual die cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!

LACE-IN SUSPENSION

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



SNAP-IN SUSPENSION

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. *Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!*

Over 300 safety products carry this world-famous trademark

WILLSON PRODUCTS, INC.
231 Washington Street, Reading, Pennsylvania

were ordered in the first five months of the year. The rush began in June, slowed in the fall, and became a stampede in the final two months, when the railroads agreed that they would order a total of 87,500 more new freight cars of various types.

As a consequence, we enter the new year with an order backlog of about $1.15 billion, representing nearly 145,000 cars, compared with a 1955 production of about 38,000 cars. Due to material shortages, it is obvious that many of the cars ordered in 1955 cannot be delivered until late 1956.

Furnaces:

Equipment sales last year were best ever . . . See good '56.

Carl L. Ipsen
Executive Vice-President
Industrial Heating Equipment Assn.

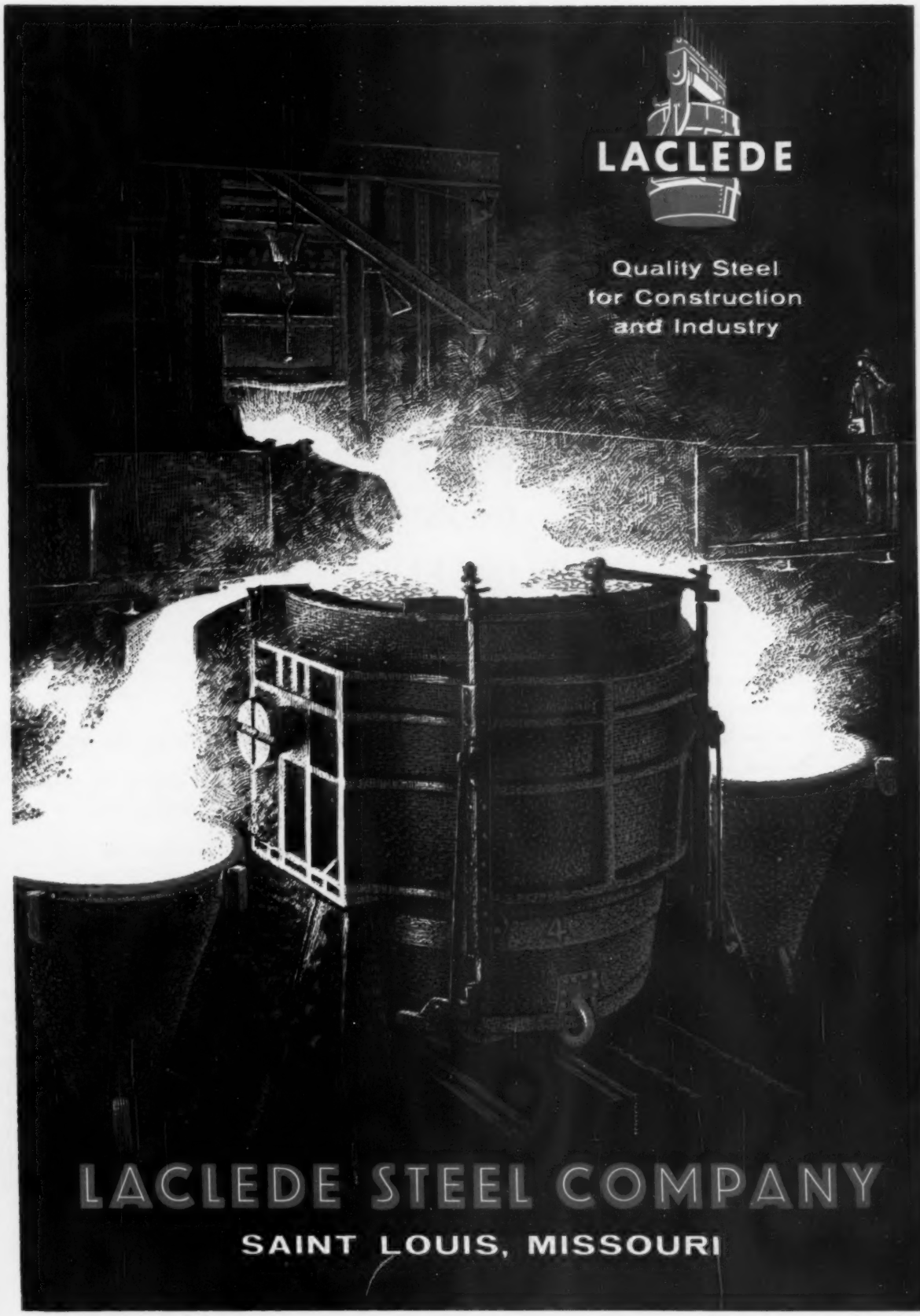
On the basis of orders received, last year was the best in peacetime history for the makers of industrial furnaces, combustion equipment, induction and dielectric heating equipment and related products. Business was a fraction better than 195 pct of 1954 volume. Outlook for 1956, according to a survey made among IHEA members, is for a slight drop. Members anticipate doing about 88.5 pct of 1955's record-breaking business.

Makers of industrial heating equipment credit the technical advances in the recent past for their astonishing business record last year.

Highlighting the technical advances of the last 12 months were:

1. Refinements in mechanization and automation. In some plants heat treating equipment operates entirely without attendants.

2. Several production sized vacuum melting furnaces were placed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A. W. Eastin—Phone: 4-0979

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Phone: FRanklin 6-0481

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Paul R. Spencer Co., Inc.—
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FORT WORTH, TEXAS
C. A. Fischer—Phone: Fannin 6402 or 5435

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Lane Johnston
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WYCKOFF STEEL PRODUCTS—Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Wide Flats up to 12" x 2" and 14" x 1¼" • All types of furnace treated Steels

in operation during the year, largely for melting special alloys. They are demonstrating the increase in physical properties that can be obtained by vacuum melting.

3. An increased trend in the steel industry toward the use of continuous lines for annealing and galvanizing steel strip.

4. Progress in the heat treatment of steel plate and structural shapes to produce superior strength for the same amount of steel.

5. Improvements in cover type strip annealing furnaces have improved the quality of product and reduced heating and cooling time, thus saving floor space and inventory tie-up.

6. A low-voltage electric furnace introduced last year has heating elements that operate directly in a carburizing atmosphere.

7. Full automation and high speed production has been attained in several forge shops through the use of induction heaters.

8. Controlled atmospheres, the basic development of the past few years, continues to be the main spark plug in fostering the modernization of heat treating equipment.

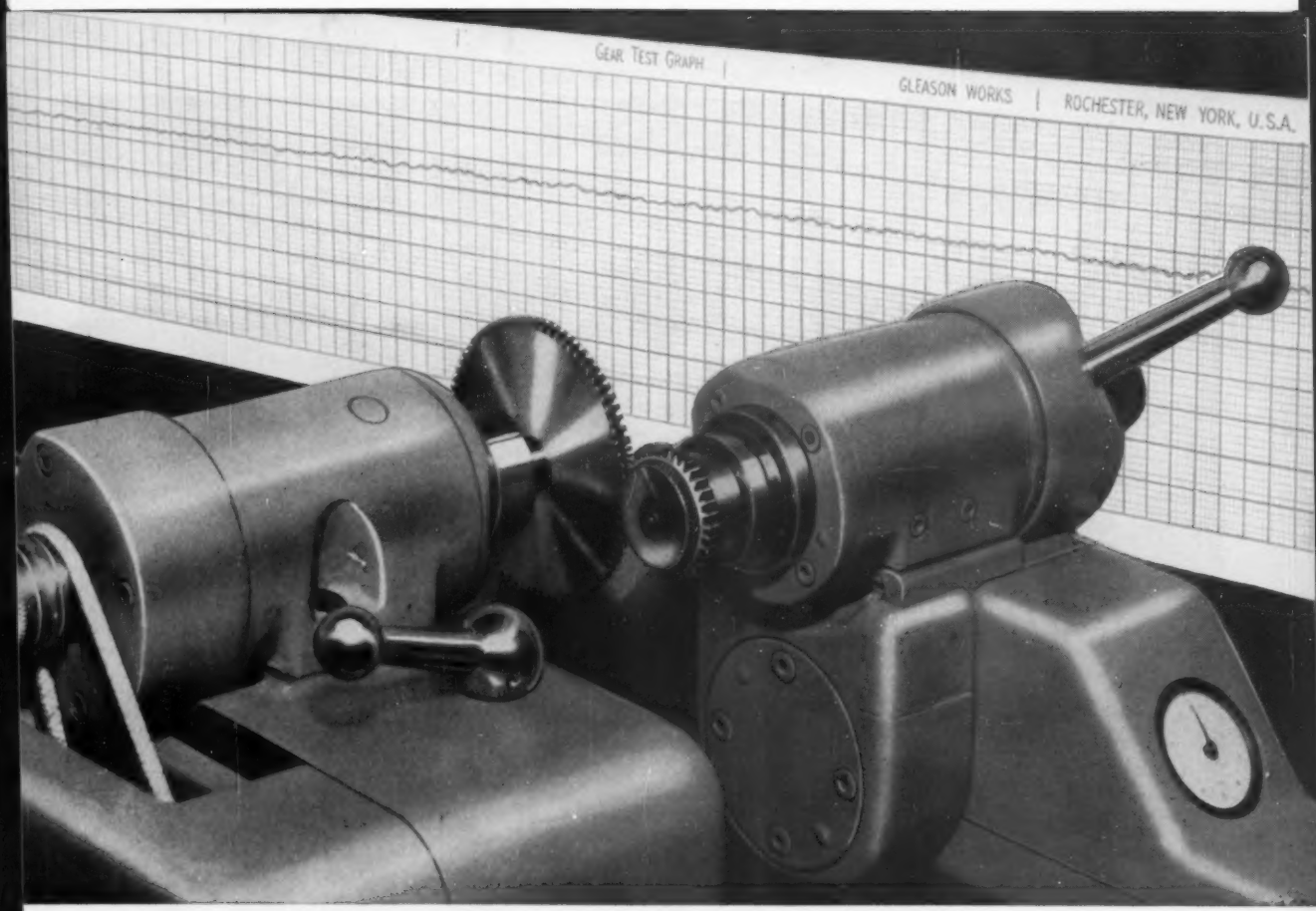
Gas:

Industry expects to surpass records made in '55.

Dean H. Mitchell
President
American Gas Assn.

The gas industry met and surpassed all predictions made a year ago for 1955. It established new records in number of customers served, in volume of utility gas sold and in revenue received from the sale of gas. Natural gas reserves rose to a new high level, after a record production of natural gas in 1954. The industry is confident it will establish new records again in 1956.

Natural gas systems are continuing to spread into new areas and to expand present networks to augment supplies in residential and industrial territories now being served. Under approval of the Federal Power Commission about 4500 miles of new natural



Make a complete test and record of your small spur and helical gears

You can be certain that your spur and helical gears will operate correctly in their final mountings if you give them a complete test *before* actual assembly.

The new Gleason No. 104 Spur Gear Tester gives you a complete check of your gears. A rolling test for composite error provides a quantitative check of tooth spacing, profile shape and runout.

In this test, the gears are slowly rotated while a calibrated spring load keeps them in metal-to-metal contact. Any error in the gears results in a horizontal movement of the drive spindle. A completely electronic pickup and recorder make a *permanent* chart of the results.

But there is still another test you can make with the No. 104 Tester—a running test, which simulates actual operating conditions, determines the smoothness of operation, noise characteristics, and tooth contact, which will actually be obtained when the gears are used.

This machine tests precision and commercial gears up to 4½″ center distance.

We will gladly furnish further information on the No. 104 Spur Gear Tester. Write for our bulletins.

The No. 104 Tester is furnished complete with an electronic pickup and recorder unit, as shown above.

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

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81

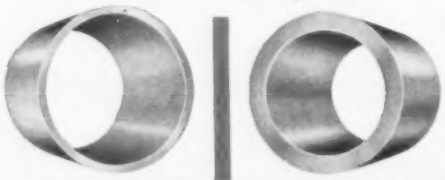
looking for the right tube in

WELDED STAINLESS?

Check Standard's Complete Range of tube and pipe sizes!

Whether it's for a pressure, mechanical, sanitary or ornamental use – Standard offers you a convenient "one source" answer to your welded Stainless Steel Tubing need.

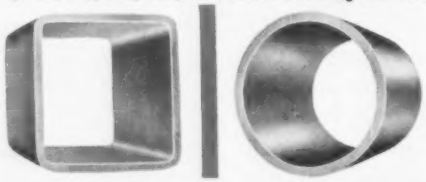
TUBE SIZES: ¼" to 4" OD .025 to .148



PIPE SIZES: ⅛" to 2" IPS Schedule 40

TYPES: 430, 302, 304, 309, 316, 321, 347; and others including low-carbon grades.

SHAPES: Squares, Rectangles and Special Shapes



PIPE SIZES: ⅛" to 4" IPS Schedules 5 & 10

Send for Stainless Folder! Our engineers will gladly assist you in your selection of the tube best suited to your needs! Write today!

Specify Standard for

- WELDED STAINLESS TUBING AND PIPE
- WELDED CARBON STEEL MECHANICAL TUBING
- BOILER AND HEAT EXCHANGER TUBING
- EXCLUSIVE "RIGIDIZED" PATTERNS

gas transmission pipeline were authorized last year. More than 3000 miles of this long-line transmission pipe were actually laid and over 1500 miles were underway at the year end.

Steel Needs to Continue

To meet the rapidly accelerating demand for gas services the gas industry will require 6.2 million tons of steel in the 1955-1958 period. Approximately 2.2 million tons of steel were used in 1955 by the gas industry. Of the all-over total for four years, about 3 million tons will be in the form of 16 inch or larger diameter pipe for transmission lines. An additional 200,000 tons of steel in other forms, and about 815,000 tons of cast iron will be required by the gas utility and pipeline companies from 1955 through 1958.

Mr. Mitchell is president, Northern Indiana Public Service Co., Hammond, Ind.

Gears:

Biggest '55 year seen as stepping stone to better '56.

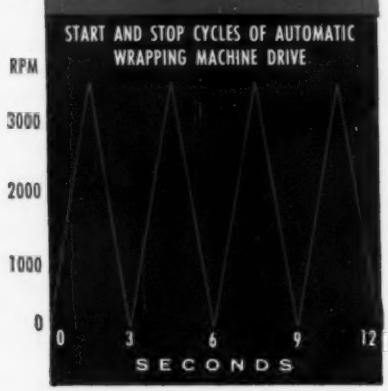
John C. Sears
Executive Secretary
American Gear Manufacturers Assn.

Last year was the biggest (dollar - wise) in the history of that portion of the gear industry represented in AGMA. We estimate that 1955 will be over 20 pct better than 1954 and close to 100 pct better than the average for the years 1947-8-9.

Gears and geared mechanisms are components of many end-use products that require long lead time scheduling. Thus, the steady rise of gear bookings in the last half of 1955 augurs well for the entire industrial economy, and will continue far into 1956.

Our industry is successfully meeting increasing demands for

20 ROLLS OF "SARAN WRAP" EVERY MINUTE



The Dow Chemical Company's production of "Saran Wrap" has leaped from 130,000 rolls to 4,000,000 rolls a month since 1951. This up-swing is due to a new plant, a new flow system, and additional equipment including new machinery equipped with Reliance V★S Drives.

One of the most dramatic applications of V★S Drives is on the final wrapping machines shown here. The drives must be able to start, accelerate to 3500 rpm., and stop more than 20 times a minute.

The most important feature, though, is not the frequent starts and stops, but the delicately controlled acceleration of the drives. "Saran Wrap" is only 1/6th as thick as a human hair, and sharp or jerky starts will cause a break in the sheet and halt production. Reliance Drives do the job day in and day out without a single break due to uncontrolled acceleration.

This feature of V★S Drives, called *Dynamic Response*, is only one of the many facets of Reliance Drives. V★S Drives can regulate tension, synchronize operations, control speed rates, and automatically program speed changes.

Whether you handle a thin film of plastic or steel billets, on a complete production line or a single machine, Reliance can give you better quality, more production, and lower costs through Variable Speed Drives. D-1508

Write for bulletin D-2311.

RELIANCE ELECTRIC AND ENGINEERING CO.

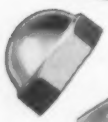
CLEVELAND 10, OHIO • OFFICES IN PRINCIPAL CITIES
Canadian Division: Welland, Ontario

there's no premium for precision

with

"Fischer Turned"

BRASS AND ALUMINUM NUTS



Costing no more than nuts produced by other, less accurate methods, Fischer precision-turned brass and aluminum nuts make possible important savings in assembly operations. Check these advantages:

Countersunk on both sides for faster starting . . .

Tapped square with face to Class 2 tolerances for smoother, easier running and superior bearing surfaces . . .

Turned from stock under basic size so they're never tight on wrenches . . .

Tapped through, eliminating "blanks" or rejects . . .

Cleaned and degreased before delivery to save you these operations.

Specify Fischer on your next order. A complete range of standard types and sizes is maintained in stock . . . "specials" can be produced quickly and inexpensively.

Write today for Catalog No. 55

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445 Morgan St. • Cincinnati 6, Ohio

TURNED NUTS Fischer SPECIAL MFG. CO. CINCINNATI OHIO SINCE 1905

C-284-FS

tolerances on a production basis that just a few years ago were attainable only on a selection basis. Other demands stem from the need for ever faster operating speeds for all types of geared equipment, reducing operational noise, and transmitting higher and higher horsepowers through smaller and smaller gears.

We are keeping a step ahead of these developments by huge investments in equipment and improvement of design and production engineering service.

We confidently believe that we can meet any foreseeable need for our products. Last year was merely the stepping stone to a bigger and better 1956.

Heat Treating:

Advances expected in control of cooling and quenching.

Howard N. Bosworth
President
Metal Treating Institute

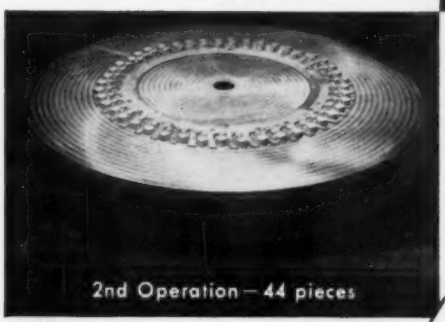
In the days ahead, atmospheres to protect and add closer controls to the finish and physical properties of the heat treated parts will be available with means of controlling and maintaining these results. The field of electronics with a great assist from the physicist will contribute to an even greater degree to the attainment of the projected goals which the metal treater has set for the future.

Aim For More Accuracy

The field of accuracy and control in metal treating will be expanded more in what I call the third dimensional field of metal treating which is not in the field of heating but in the wide application of cooling or quenching. Greater capacity, control and flexibility will be achieved in the field of quenching in order to eliminate or minimize the distortion and amount of final finishing after heat treating, which will greatly facilitate the production and lead to greater economy in the field of manufacture.

Another example

W-1138



W-1139

# of Blanchard versatility

No. 303 Stainless Steel Forging

653 oddly shaped, non-magnetic workpieces

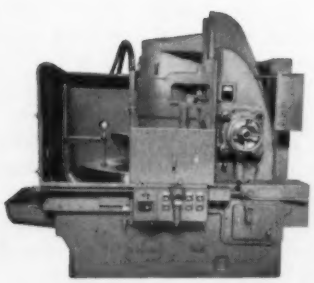
Blanchard Surface Grinders are noted for their unusual versatility—like grinding small, non-magnetic stainless steel forgings in quantity.

In the first operation, 653 forgings are loaded and blocked between rings on a No. 18 Blanchard, with 36" magnetic chuck (stock removal .010"). Parts, chuck and rings are sprayed with oil, and molten sulphur is poured around the parts to hold them. After grinding, the sulphur is easily stripped away.

This entire operation takes only 1½ hours—including preparation of the sulphur.

In the second operation, 44 pieces are set in a notched steel ring. Tilting the wheelhead and maintaining wheel pressure in one direction holds these non-magnetic pieces in the notches. Stock removal from this surface is .030", to tolerance of ±.003. Each load takes eight minutes—floor-to-floor.

As a result of this ingenious workholding, each piece is ground on both sides in a fraction of a minute, at less than 98¢ abrasive cost for all 653! That's typical of the convenience and economy of grinding on a Blanchard—whether the parts are magnetic or non-magnetic!



Send for free copies of "Work Done on the Blanchard", 4th edition, and "The Art of Blanchard Surface Grinding", 3rd edition—recently revised.

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

TOUGH!

U. S. Patent #2184926
(Other patents pending)

Is your present abrasive tough enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned.* Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test—put muscle behind *your* blast cleaning with Malleabrasive! *We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.*

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

MALLEABRASIVE®

Probably one of the outstanding events of the year in the field has been the installation of two large vertical heat treating furnaces by two members. The need of such furnaces by commercial heat treaters indicates an expanding demand by industry for handling on a commercial service basis of the long and large parts such furnaces can take. The industry itself feels quite optimistic about 1956 and many plans for expansion and replacement of obsolete equipment are being formulated.

Investment Castings:

Expect sales to increase 30 pct this year . . . Quality is up.

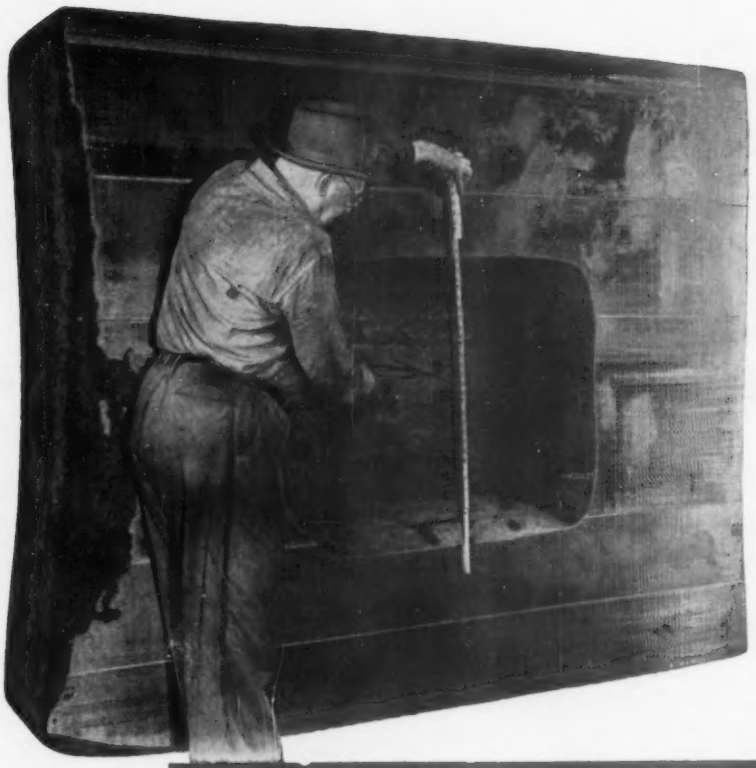
Vincent S. Lazzara
President
Investment Casting Institute

A 30 pct increase in sales is forecast for the investment casting industry in 1956. This prediction is based on Investment Casting Institute statistics indicating that new orders in recent months are 40 to 50 pct over orders for the same period a year ago. A conservative estimate would put 1956 sales at $175 million. This is in sharp contrast to a total sales figure of only $75 million in 1948.

Improve Quality Control

The increased emphasis on improved quality control and a recognition by producers of the limitations of the investment casting process have contributed greatly to the 10-year growth of the industry from a laboratory process to full maturity.

While increasing applications for aircraft components remain the backbone of the industry's strength, there is a phenomenal increase in new applications for such items as electronic equip-



Forged-in pockets provide tougher, stronger dies

This 35,000-pound die block, made of Finkl FX-T3 steel, has a forged-in pocket 12″x29″x34″. In addition to the improved physical properties, the pocket forging increases the saving in machining time. There are many ways, such as this, that Finkl engineers can help you when planning die block or forging requirements.

When you next consider hot work tooling, die blocks or forgings, consider Finkl for the best. The quality of Finkl Hot Work Die Steels is the finest available and costs you less in the long run. Finkl die blocks will make a lasting impression with "impressions that last." Our engineers will gladly offer the advantage of their knowledge and our experience. There is no obligation.

DIE BLOCKS
•
HOT WORK STEEL
•
FORGINGS
•
ELECTRIC FURNACE STEELS

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HOUSTON • ALLENTOWN • ST. PAUL • COLORADO SPRINGS
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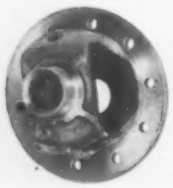
How about Malleable ?

...Don't overlook the advantages of this highly versatile material!



STANDARD malleable iron is a strong cast ferrous alloy having a remarkable combination of properties:

- ✔ Toughness and ductility
- ✔ Excellent machinability
- ✔ High impact resistance
- ✔ Resists corrosion

...and how about Pearlitic Malleable?

PEARLITIC malleable iron is a special type of malleable having these unique characteristics:

- ✔ Exceptional bearing properties
- ✔ Easily machined
- ✔ High yield strength—45,000 to 80,000 psi.
- ✔ Can be selectively hardened

It's easy to design for simplicity and good appearance in malleable iron —helps you cut costs on current production. Consult your nearest malleable foundry or write to the Malleable Founders' Society for further information.

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

ment, machine tools, business machines, food equipment, farm machinery, turbines, compressors, oil field tools and sewing machines.

Mr. Lazzara is president, Casting Engineers, Inc., Chicago.

Lead:

Consumption up 5 pct in '55 with strong battery, building use.

R. L. Ziegfeld
Secretary-Treasurer
Lead Industries Assn.

The lead industry in general gave a good account of itself in 1955. Domestic consumption of lead is estimated at between 1,150,000 and 1,200,000 tons, an increase of approximately five pct over 1954. The increase, however, was not shared equally by all the users of lead. Storage batteries, for example, which are the largest consumer, increased five pct, but building construction and solder increased about 25 pct. On the other hand, the use of lead for cable sheath declined about 10 pct. The sale of tetraethyl lead continued its steady increase.

Total supplies of lead available to American industry were approximately the same in 1955 as in 1954, at about 1,230,000 tons. Production of lead from mines in the United States, from secondary smelters, and from imports of ore all increased moderately, but imports of metal declined somewhat.

CHICAGO CONCRETE ON THE JOB IN 2 HOURS

Saved

40 HOURS OF PRODUCTION

"WE THOUGHT OUR FURNACE WOULD BE OUT OF PRODUCTION AT LEAST 2 DAYS . . . BUT WITHIN TWO HOURS AFTER THE BREAK-OUT CHICAGO CONCRETE WAS ON THE JOB . . . AND IN 24 HOURS WE WERE BACK IN FULL PRODUCTION," so commented the superintendent of blast furnaces at a well-known steel mill. It is another story typical of the speed that CHICAGO CONCRETE is capable of — speed that has saved customers thousands of dollars. This is the story:

At 11 P.M. we received an emergency call . . . a breakout of iron on the hot metal tracks had burned up the tracks and welded a number of railroad trucks to them. By 1 A.M. the first CHICAGO CONCRETE men were on the job. In 8 hours they had the spill cleaned up and new tracks laid. Four sets of railroad trucks were saved from the scrap-heap by the careful use of dynamite . . . a service that CHICAGO CONCRETE are experts at.

On the job faster . . . with experienced skilled personnel . . . employing the most modern equipment . . . that is CHICAGO CONCRETE'S story. You, too, can depend on CHICAGO CONCRETE in any emergency.

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AND NOW

CHICAGO CONCRETE CONSTRUCTION COMPANY offers a complete industrial construction service . . . handling anything from minor masonry, steel or foundation repairs to complete furnace rebuilds.

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS

if the question is perforating...

Ever stop and think that the answer to your design problem may be simple perforations? Whatever material you're working with, if it's metal, masonite, rubber, plastic, hard or insulated board for decorative or display usage, Hendrick can help you. Over a period of many, many years Hendrick has built up the largest stock of dies commercially available.

If you are faced with the need for perforated materials

the answer is HENDRICK!

or if you would like more information on how perforating can enhance the sales appeal of your products, get in touch with Hendrick today.

Hendrick
MANUFACTURING COMPANY
37 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Assuming a general continuance of good business in 1956, the lead industry can expect another good year. Already the battery industry is predicting the sale of about 25,000,000 replacement batteries next year as compared with an estimate of 24,000,000 in 1955. Tetraethyl lead makers expect continued moderate expansion in this country despite the fact that a new plant in England is now operating full scale and a new plant in Canada will go into operation in the latter part of 1956.

Machine Tools:

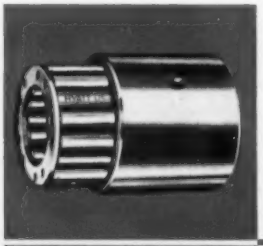
Promising outlook hints sales in '56 will top '55.

Louis Polk
President
National Machine Tool Builders' Assn.

Machine tool sales for 1956 will probably exceed those for 1955, but will not reach the totals of defense emergency years. This estimate is based upon the assumption of continuing sound business conditions within the United States under a peace-time economy.

Machine tool shipments for 1955 are estimated by the National Machine Tool Builders' Association at approximately $660,000,000, by comparison to $891,750,000 in 1954 and $1,191,200,000 in 1953, the year in which the full impact of the Korean defense program was felt in the machine tool industry. These facts must be considered against an economic background which discloses the nation's present gross product establishing new all time highs. Year-end backlog is equivalent to about five months output at current rate of production. Backlog varies greatly, however, with individual companies.

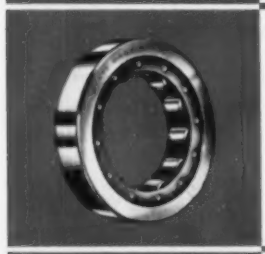
Shipments in 1954 included holdover deliveries on behalf of the Korean program. Shipments



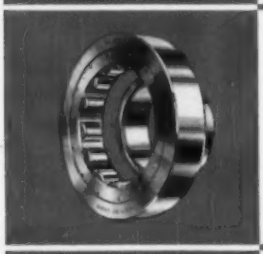
TRUNNIONED ROLLER CAGE—Economical for volume use on thin-annulus bearings. End rings are hardened steel stampings, connected by riveted bars interspersed between rollers to form an integral unit. Races can be omitted if desired.

POCKETED END RING CAGE—Designed for fairly large bore bearings in heavy-duty service. Rollers are guided accurately by pockets drilled in bronze end rings. Riveted connecting bars form an integral unit, so races can be omitted if desired.

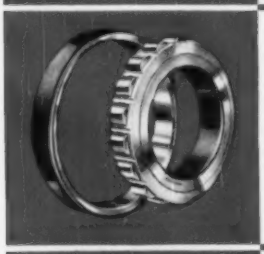
STAMPED STEEL SEPARATOR—Economical for volume use on wide range of bearings with short rollers. A single steel stamping with bars coined to conform to roller contour. Simple, open design assures large lubricant capacity and good circulation.



FORMED BAR CAGE—Well adapted for volume use on heavy-duty bearings. Hardened steel end rings are connected by cold-rolled shaped bars conforming to roller diameter. Insures quiet operation, better roller guidance, and the smooth surface of bars protects rollers.



DRILLED POCKET CAGE—Used on better-grade bearings to provide extremely close control of rollers, which operate in pockets drilled and reamed in bronze cylinder. Riveted ring on one end retains rollers permanently, so races may be omitted if desired.



SEPARABLE BROACHED POCKET CAGE—Used only on finest high-speed bearings. An integral bronze cylinder with pockets broached for maximum uniformity. Insures minimum friction, better oil circulation for cooling. Rollers can be removed for inspection.

NON-SEPARABLE BROACHED POCKET CAGE—Similar to the above and offers all the same operating advantages. Used for "blind" installations where rollers must be retained with inner or outer race. Roller drop controlled by deforming bars after rollers are placed.

What makes a cylindrical roller bearing good?

When you buy a roller bearing, you expect it to do a certain job for you. How well it does that job depends on many different factors. This series of messages is designed to help you recognize some of these important differences and get more for your bearing dollar.

The RIGHT KIND OF RETAINERS for the application

The basic parts of a roller bearing are the rollers, the races, and the *retainer* which locates and guides the rollers. There are significant differences in the design and construction of retainers, which influence bearing cost and performance. Some are simple and economical, well adapted for volume production; others are more costly but insure improved roller guidance, or cooler and smoother operation, or longer heavy-duty service. Beginning with the most economical, here are the seven basic types in current use:

HYATT MAKES ALL SEVEN TYPES . . . EACH THE FINEST OF ITS KIND! You will find complete details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, N. J.

GM GENERAL MOTORS

HYATT

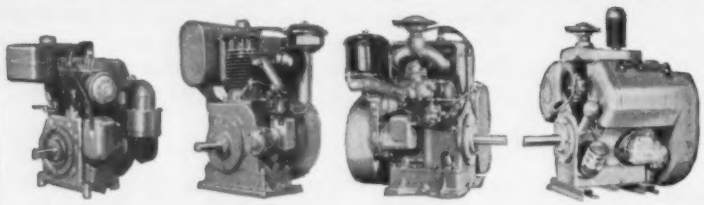
ROLLER BEARINGS

Specializing

Most Specified as

STANDARD POWER COMPONENTS ON ORIGINAL EQUIPMENT . . .

WISCONSIN HEAVY-DUTY Air-Cooled ENGINES



Single Cylinder 3 to 8¼ hp. | Single Cylinder 6 to 9 hp. | Two-Cylinder 7 to 15 hp. | V-type 4-cyl. 15 to 36 hp.

IN THE FARM FIELD...

Specified by leading "blue chip" builders of farm and orchard equipment for: combines, pickup balers, forage harvesters, garden tractors, field crop and orchard sprayers, irrigation pumping units, portable elevators and many other machines.

Wisconsin-powered Model 87 New Holland Baler.

IN THE CONSTRUCTION FIELD...

Specified for leading makes of concrete mixers, concrete finishers, concrete cutters, power "wheelbarrows", hoists, bituminous spreaders, ditch diggers and trenchers, road rollers, conveyors, compressors, arc welders, pumping units, standby electric generators, etc.

Wisconsin-powered Smith DeLuxe Truck Mixer.

IN THE OIL FIELD...

Widely specified as integral power for many types of oil field utility units such as oil well pumps, gathering pumps, dope kettles, pipe straightening machines, compressors, salt water disposal pumps, trenchers, standby power units, etc.

Wisconsin-powered Oil Field Booster Pump.

IN THE INDUSTRIAL FIELD...

Specified for plant floor sweepers and scrubbers; fork-lift, pallet and platform trucks; plant fire-fighting equipment; truck and trailer refrigeration systems; power lawn mowers and leaf sweepers and a great variety of specialized applications in many fields.

Wisconsin-powered Hyster Fork Lift Truck.

Because Wisconsin Heavy-Duty Air-Cooled Engines match the equipment of which they become integral units . . . because they fit both the machine and the job with maximum power advantage and minimum maintenance cost . . . these fine engines merit the serious consideration of design engineers and builders of equipment utilizing engine power within a 3 to 36 hp. range.

Write for Bulletin S-165 and tell us about your power problem.

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

in 1955, however, represented in the main domestic replacement peace-time orders, with only 14 per cent accounted for by rated defense orders and only 10 per cent accounted for by foreign sales.

The anticipated upturn in 1955 sales is founded upon the upsurge in orders which followed the National Machine Tool Show held in Chicago in September, at which the very latest models of new machine tools were exhibited.

Several reasons point up necessity for replacement programs. First, many machine tools in use are those of World War II vintage. Second, accurate machining is assuming greater importance. Thirdly, automatic controls are essential for more efficient operation. Lastly, competition will be such that it must be met by installing machines which will increase productivity and thereby reduce unit cost.

Mr. Polk is chairman and president, The Sheffield Corp., Dayton, Ohio.

Malleable:

Shipments of 1,050,000 tons may be topped in '55.

Carl L. Liebau
President
Malleable Founders' Society

The malleable iron castings industry enjoyed an exceptionally high level of business throughout 1955. It now appears that total shipments for the year will be in the neighborhood of 1,050,000 tons, an improvement of nearly 30 pct over 1954. This would be the second best year on record—and it is entirely possible that shipments may exceed the record of 1,085,000 tons shipped in 1951.

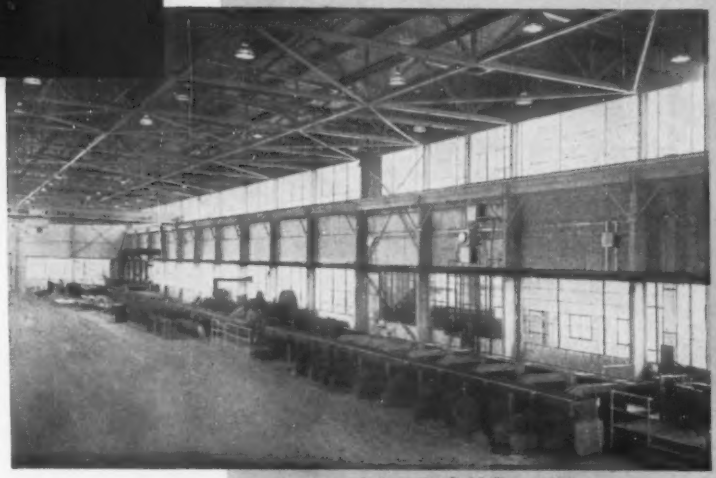
Growth and expansion within the industry have taken place in companies which are modernizing and improving their facilities. A number of companies are expanding pearlitic malleable facilities in the light of the phenomenal demand for this product. Anticipated shipments of pearlitic malleable for 1955 will be in the neighborhood of

McKAY

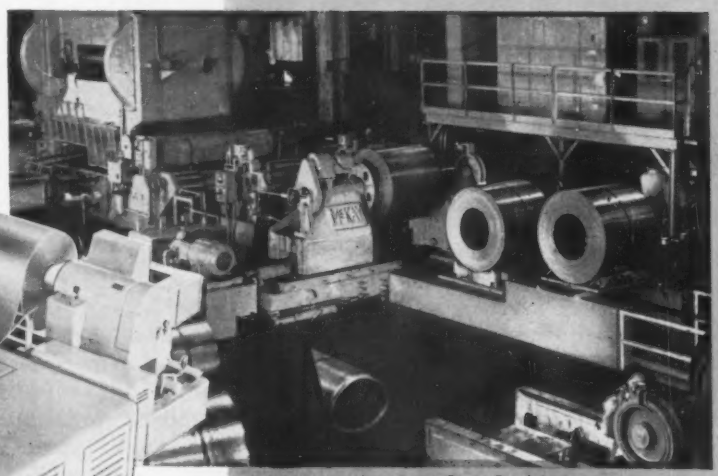
Specializing in Automatic Steel Processing Machinery

THE NEXT DECADE will see more engineering and technical advancement than we have experienced in the last 25 years. This advancement will be due to the economic pressure on industry to continually reduce manufacturing costs. Cost reduction can only be accomplished by the invention of new processes or the development of new methods or the automation and mechanization of existing machines. Whether you require a single machine or a completely automatic line, you'll be wise to consult McKay, where progressive ideas are backed by 35 years of "on the job" experience.

You'll find machines of the types pictured on these pages in current use in plants bearing America's foremost industrial names.

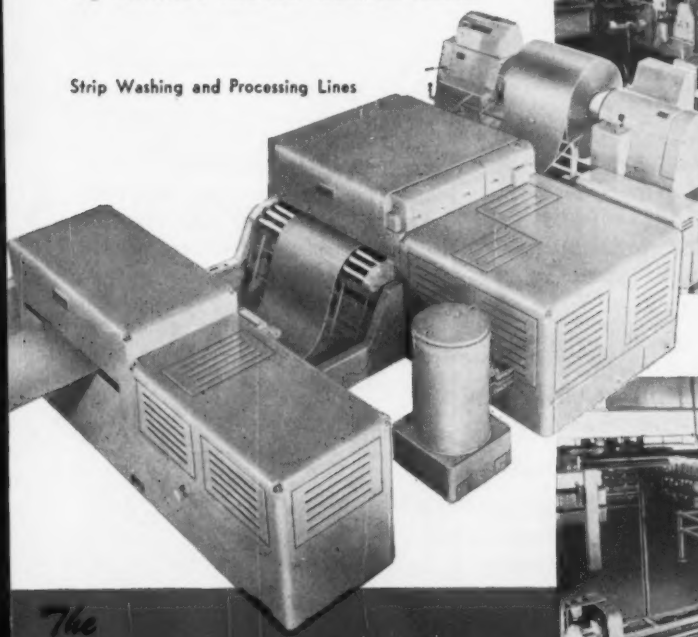


Automatic Cold Draw Lines

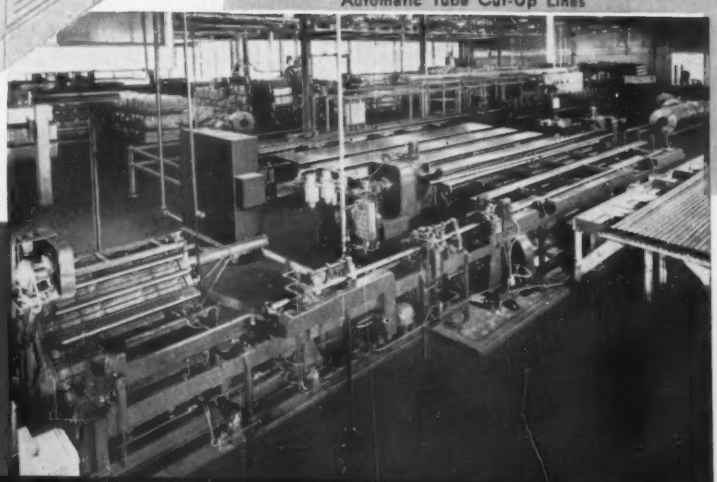


Automatic Press Feed Lines

Strip Washing and Processing Lines



Automatic Tube Cut-Up Lines



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170,000 tons, or approximately double shipments in 1954.

We assume that shipments of malleable castings in 1956 will, as in the past, pretty well parallel the trend in the general level of business. All signs up to now point to a continued high level of business in 1956 and, accordingly, we would anticipate shipments ranging from 1,000,000 tons to 1,100,000 tons.

Mr. Liebau is president and general manager, Federal Malleable Co., West Allis, Wis.

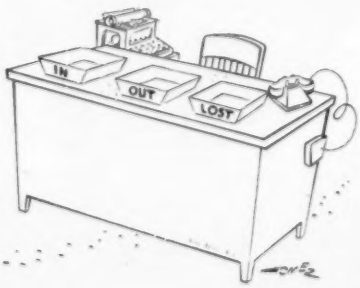
Manganese:

Demand increase spurs imports and domestic production.

J. Carson Adkerson
President
American Manganese Producers Assn.

Expanding requirements of the steel industry boosted consumption of manganese ore in the United States in 1955 to a new high level substantially above the 1953 peak of 2,254,000 short tons. Following the decline in 1954, imports rose sharply but not enough to pace the rapidly mounting demand. Industry stocks declined. At midyear they had shrunk to scarcely a half year supply. Domestic ore production, largely channeled into Government stockpiles, registered significant new gains under the continued stimulation of the assured price program.

The output of high grade ore from U. S. mines reached a total of approximately 300,000 short



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Faster, more economical production with closer control of product quality — that's the thinking that goes into every Wean engineered sheet, tin or strip mill line.

Leading steel mill officials the world over have learned they can depend on Wean engineers to design and produce equipment unmatched in accuracy, high production and economical operation.

If you're planning production improvements to combat high labor costs, increase your margin of profit or improve the quality of your product, make sure you check first with a Wean engineer.

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

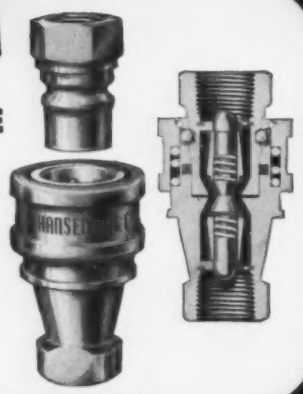
tons. This figure is almost 50 pct higher than the 1954 output and nearly three times the annual production rate in 1951 when the General Services Administration was authorized to purchase domestic ores at stated prices over a period of years. Current production rates for high grade domestic manganese ore have already exceeded the rate for any previous period except perhaps briefly toward the end of World War I.

The carload program, designed for small operators, calls for a quota of 19 million long ton units by June 1958. Of this total, only 3,642,084 units had been delivered by mid-1955, but shipments were continuing at an accelerated pace.

HANSEN

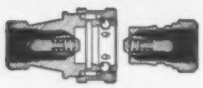
QUICK-CONNECTIVE

2-WAY SHUT-OFF COUPLINGS!



QUICK CONNECTION AND DISCONNECTION

INSTANT AUTOMATIC FLOW OR SHUT-OFF



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WATER • COOLANTS

HOSE CLAMPS
HOSE CLAMP PLUGS
HOSE CLAMP SOCKETS
HOSE CLAMP COUPLINGS

To connect a Hansen Two-Way Shut-Off Coupling, you just pull back the sleeve and push the Plug into the Socket. To disconnect, merely pull back sleeve. No tools required. Similar valves in Socket and Plug shut off both ends of line when Coupling is disconnected—practically eliminate spilling of liquid or escape of gas at instant of disconnection.

FEMALE PIPE THREAD CONNECTIONS FROM ⅛" TO 1"

Hansen Series HK Two-Way Shut-Off Couplings are available with female pipe thread connections from ⅛" to 1" inclusive. Available in brass or steel.

Also Straight-Through and One-Way Shut-Off Couplings. Write for Catalog.

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THE HANSEN MANUFACTURING COMPANY

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Material Handling:

Equipment makers see good year ahead . . . New design trends.

R. H. Davies
President
The Material Handling Institute, Inc.

The outlook for 1956 for all material handling equipment manufacturers is good, at least for the first half of the coming year. This optimism is based on the upward trend of capital investment in new plants and heavy equipment. It is also based on the fact that 1956 may be the year in which we face a shortage of labor just when many manufacturers will be striving for increased production in existing facilities. Both of these factors will necessitate increased mechanization in material handling.

Sales bookings for 1955 were more than 20 pct over 1954. This high level is expected to be maintained or exceeded in the new year.

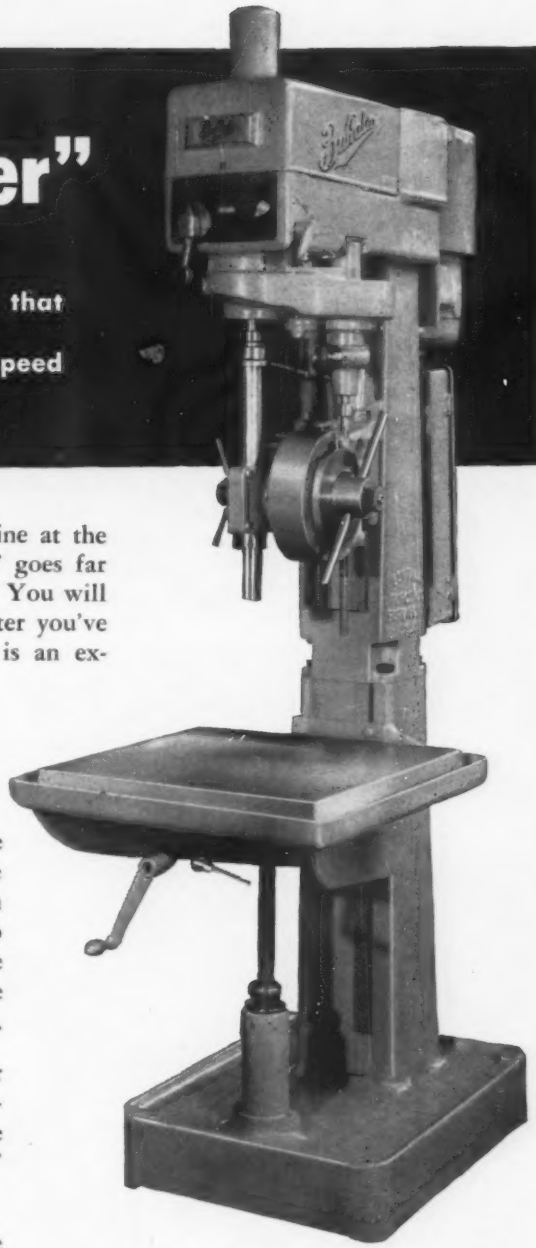
"Trim a little more off the back hmm?"

You Have to Operate

THE NEW "RPMster"

to Believe It!

- So perfectly balanced and fitted that it's vibrationless!
- So smooth in feed and spindle speed adjustment!
- So responsive to your commands!



Those who saw this great new drilling machine at the NMTBA Show will verify it. The "RPMster" goes far beyond the ordinary concept of a "drillpress." You will want to have one or more working for you, after you've had the experience of operating one—and it is an experience!

First, its gearless drive and perfectly fitted spindle provide extreme smoothness and quietness of operation.

Second, you can instantly get any low range spindle speed from 100 to 550 R.P.M.s at the touch of a lever — and, by switching to high range in a few seconds, any speed from 500 to 3000 R.P.M.s. Here is the really versatile machine for smooth work flow through the wide range of drilling, reaming and tapping operations.

And as the "Buffalo" power feed obeys your touch, you know you're completely in command of this powerful 88" high machine. The "RPMster" lives up in every way to the "Buffalo" "Q" Factor* standard of performance.

Your nearby "Buffalo" representative will be glad to arrange a demonstration, or write us.

Buffalo No. 1 "RPMster"—the drill with 1001 instantly changed spindle speeds.

* The "Q" Factor — *the built-in Quality which provides trouble-free satisfaction and long life.*

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

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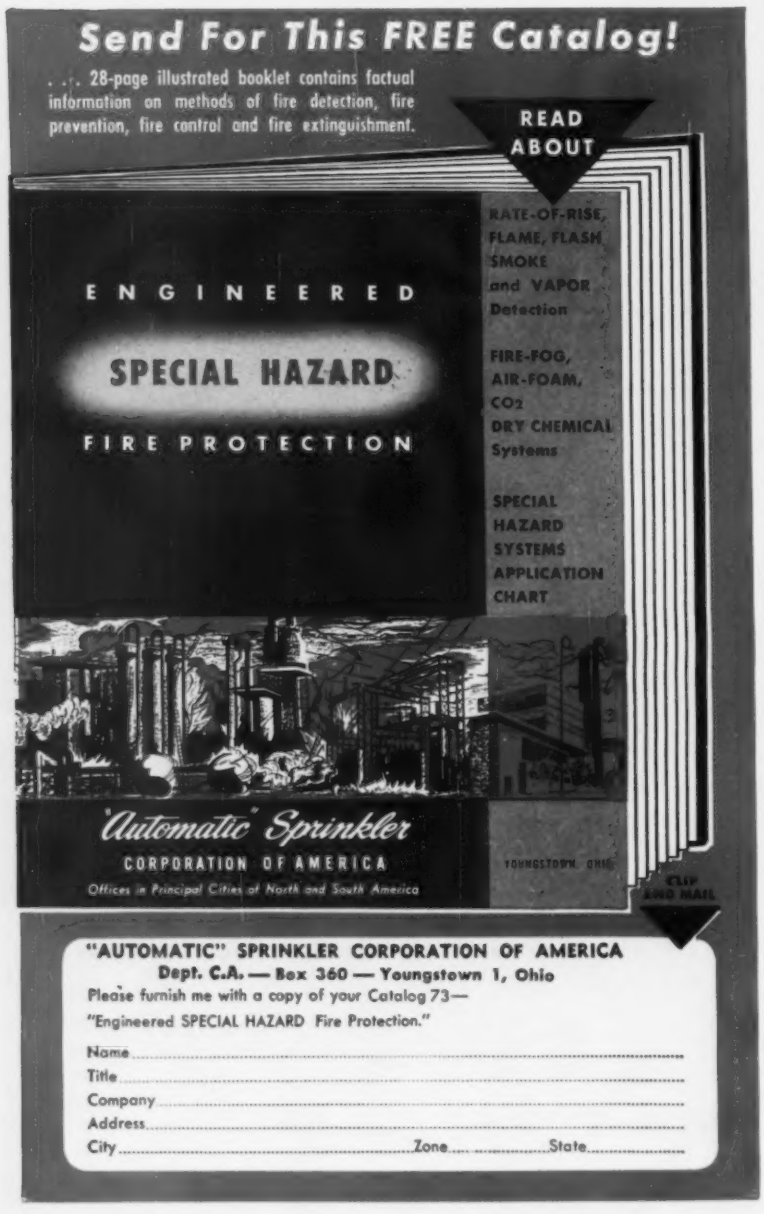
Will Emphasize Safety

Material handling equipment manufacturers will place more emphasis on safety, speed of handling, rate of travel, versatility, and the development of specialized equipment in 1956.

Two important concepts are becoming more prominent in the material handling field. First is the increased emphasis on unit loads and potential savings realized thereby. The second is increased emphasis on making maximum use of cubic space. Both of these will influence the purchase of all types of material handling equipment.

———

Mr. Davies is vice-president, Industrial Truck Div., Clark Equipment Co.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Metal Powder:

Continued growth in uses indicates greater demand.

Robert L. Ziegfeld
Secretary
Metal Powder Assn.

The metal powder industry in 1955 showed a more phenomenal rate of growth than any year in the past. This was particularly true of iron powder.

Although final figures are not available for 1955, it appears that consumption of iron powder in that year will be nearly double the previous record year 1954, and will amount to well over 30,000 tons. Also, for the first time since 1948, the consumption of domestically produced iron powder exceeded that of imported powder and the consumption of domestically produced iron powder also exceeded total consumption of all iron powder in any previous years.

Uses Increasing

The consumption of copper powder in 1955 was more than 20 pct greater than in 1954 and probably exceeded 12,000 tons. This just about equalled the previous record year of 1950 when the Korean War gave a tremendous impetus.

Assuming that general business in 1956 maintains a high level, it is expected that the metal powder industries in general will continue to show substantial growth because more and more industries are finding use for metal powders, both in the form of fabricated parts and for other applications, and because each year more and more components of such products as automobiles, home appliances and business machines are being made from metal powders. The case of iron powder new uses, aside from the manufacture of metal powder parts, such as flux coating of welding electrodes, have grown tremendously.

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HEAT-RESISTING STAINLESS
with exceptional forming qualities

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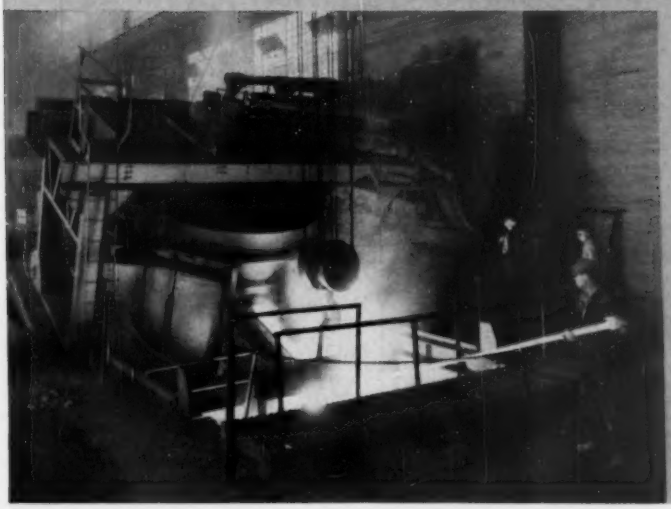
Stainless-Clad



Whatever your needs for stainless steel sheets and plates, remember that Ingersoll specializes not only in *solid* stainless, but in *heat-resisting* alloys, and *stainless-clad* sheets as well.

So our recommendations are unbiased, and are based on your *needs*. Consult our engineers, without cost or obligation.

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with THERMAL

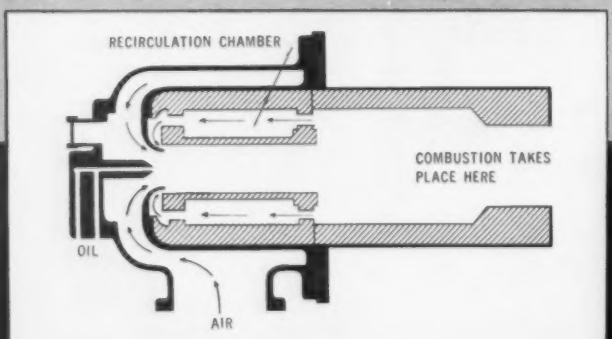
High Velocity OIL BURNERS

OIL COMPLETELY VAPORIZED WITHIN BURNER

The THERMAL High Velocity Oil Burner employs a unique principle of recirculation of hot gases that vaporizes the oil before it is burned. This results in a short, clear flame and heat release rates up to 10,000,000 btu per hour per cubic foot of combustion space.

By proper utilization of the burner's characteristics of a high velocity, high temperature, non-luminous flame, remarkable results have been obtained in furnaces, kilns, ovens and heat exchange equipment of all types.

For complete information write for Bulletin 103.



THERMAL High Velocity Oil Burners for the distillate oils (thru #3) are available in seven standard models with outputs from 50,000 btu/hr to 4,000,000 btu/hr.

OTHER THERMAL PRODUCTS & SERVICES:
GAS & OIL BURNERS • COMBINATION GAS-OIL BURNERS • HEAT EXCHANGERS • SUBMERGED COMBUSTION • COMBUSTION & HEAT TRANSFER ENGINEERING

THERMAL

Thermal Research & Engineering Corp.

CONSHOHOCKEN • PENNSYLVANIA

REPRESENTATIVES IN PRINCIPAL CITIES

Porcelain Enamel:

Continued high level indicated with appliance use strong.

Glenn A. Hutt
President
Porcelain Enamel Inst.

Business in the porcelain enameling industry is expected to continue at a high level for the year 1956, with an estimated volume set at $375 to $390 millions of dollars.

The booming major appliance market accounts for the greatest dollar volume of business in the porcelain enamel industry. Appliances that use porcelain enamel include ranges, refrigerators, food freezers, clothes washers and dryers, dishwashers and incinerators. The "glass-lined" hot water heaters are increasing in volume as more and more of the major producers enter this field. Plumbing fixtures and architectural porcelain enamel enjoy a good volume of business along with the booming construction industry.

Mr. Hutt is vice-president, Ferro Enamel Corp., Cleveland.

"We do need help, but it's hard to believe you've been a welder for 12 years."

AL Stainless Steels
for the Process Industries

VARIOUS TYPES—Generally speaking, stainless steels are divided into three groups: chromium, chromium nickel, and chromium-manganese-low nickel steels. Their corrosion resistance, hardenability, tensile strength, etc., varies with the proportion of chromium, nickel and other alloying elements each type contains.

The chromium stainless grades are divided into two types: martensitic steels, which are hardenable; and ferritic non-hardenable steels. Both types are magnetic. The chromium nickel and chromium-manganese-low nickel stainless grades are austenitic steels, hardenable only by coldworking, and are non-magnetic.

The principal chromium stainless steels of chemical industry significance are Types 410, 431 and 440A martensitic grades, and Types 405, 430, 442 and 446 ferritic steels. Chromium nickel austenitic steels of principal importance are Types 302, 304, 316, 317, 347, 309 and 310. In the more recently developed chromium-manganese-low nickel austenitic group, Type 202 has physical and mechanical properties closely approximating those of Type 302—with the advantage of much lower nickel content and more ready availability in times of nickel shortage.

PRINCIPAL GRADES—Industry has called for quite an extensive range of chemical and physical properties in stainless steels. To meet these requirements, types have been developed which are best suited for a particular application: such as Types 316 and 317 for extra corrosion resistance, Types 309 and 310 for extra high temperature service, etc. Knowledge of these stainless steel qualities is essential for engineers and designers to create a product that will best do the work for which it was intended. Complete data on AL Stainless Steels is available in the various publications listed below.

Of all the stainless steels, the grades most used in the chemical and allied industries are Types 304, 316, 317 and 347 chromium nickel steels. The first three grades are also available in extra low carbon varieties to meet extreme conditions of fabrication or service which might carry the threat of intergranular corrosion. Designated Types 304L, 316L and 317L, these low carbon stainless steels are practically immune to carbide precipitation in the as-welded condition. Like Type 347, they permit the field-welding and stress-relieving of material of any thickness, for example, without the hazard of intergranular corrosion.

REGULARLY SUPPLIED FORMS—Allegheny Ludlum Steel Corporation is in position to furnish the various grades of stainless steel in all of the commercial forms required by fabricators of these metals. These include:

- Plates, including formed heads
- Sheets, either coiled or straight cut lengths
- Strip, either coiled or straight cut lengths
- Bars, rounds . . . flats . . . hexagons . . . octagons . . . squares or special shapes
- Billets, for forging or upsetting
- Angles
- Wire
- Tubing, seamless or welded
- Castings and smooth-hammered Forgings
- Extrusions
- Clad stainless

Information as to size ranges and mill tolerances are available in literature devoted to detailed discussions of AL Stainless Steels.

SPECIAL REQUIREMENTS—When selecting a grade of corrosion and heat resisting steel for a given application, it should always be borne in mind that laboratory tests, however carefully performed, can be expected at best to be only indicative of field performance. Variations in actual service conditions are so wide that a special study of the case at hand may be necessary at times. To that end, Allegheny Ludlum engineers and technical men are available for consultation on unusual problems involving stainless applications.

FABRICATION—AL Stainless Steels may be easily fabricated by any of the usual processes—welding, drawing, blanking, machining, spinning, forging, riveting, shearing, soldering, etc. In some instances, however, care must be exercised in handling of the material to preserve its corrosion or heat resisting properties. No one should undertake to fabricate any of the stainless steels without a full understanding of these handling procedures. Proper processing is fully discussed in Allegheny Ludlum literature—available on request.

RESISTANCE TO ATTACK—There is a wide range of conditions under which AL Stainless Steels operate in resisting corrosive attack at normal and elevated temperatures. Detailed information regarding their resistance to various media, heat resistance and strength will be sent upon request. See the publication list below.

STAINLESS CLAD STEEL—Allegheny Ludlum Stainless Clad is available commercially in the following commodities:

- Double Clad—Stainless both surfaces with carbon steel core. In plates, sheets and strip.
- Single Clad—Stainless one side only; plates only 3/16" and heavier.

Special clad materials on application.

PUBLICATIONS AVAILABLE

The following list of technical and service literature is freely available on request; just ask for the bulletins which contain the type of information you need.

Blue Sheets—An individual Blue Sheet, containing certified laboratory data on physical and chemical properties, etc. is available on each grade of AL Stainless Steel.

Fabrication of Stainless Steels—Contains valuable data for your shop men on various methods of handling, forming and finishing stainless steel.

AL Stainless Steel in Chemical Processing—36 pages on various applications, advantages, etc. of stainless in the chemical industry.

Stainless Steel Handbook—A case-bound book of 124 pages, containing complete data leading to the proper selection and fabrication, etc. of the correct grade of stainless for each application.

• Write to *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

ADDRESS DEPT. NO. A-73

WAD 5787

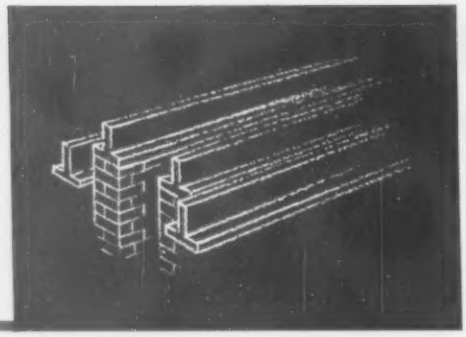
For Stainless Steel in ALL Forms—call

Allegheny Ludlum

AL STAINLESS STEEL

Warehouse stocks carried by all Ryerson Steel plants

HOLCROFT and the WALKING BEAM FURNACE



Step up production of l-o-n-g parts

The walking beam furnace is an automatic, high production furnace usually used for treating bar stock, tubes, axles, and similarly shaped products.

Stock handling is ingenious. Two sets of rails—one stationary—run the length of the furnace. The moving set lifts the stock, travels forward, and then drops down below the level of the stationary rails. The rails return to their original position and repeat the action, walking the work through the furnace. An alternate arrangement includes two sets of moving rails. One pair lifts the stock as the second moves backward. The first comes down, deposits the work on the second, which moves forward conveying the work through the furnace cycle.

Yes, there's more to designing a heat treat furnace than a knowledge of metallurgy. Other factors—stock handling for one—must be considered, too. That's why it's a good bet to bank on Holcroft experience. It will pay off in the long run.

Write for your copy of Blazing the Heat Treat Trail.

HOLCROFT AND COMPANY

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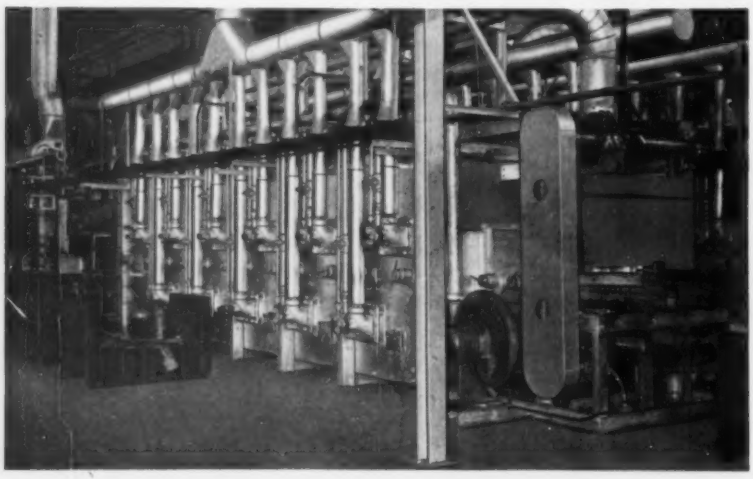
PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • DARIEN, CONN. • HOUSTON, TEXAS • LOS ANGELES, CALIF. • PHILADELPHIA, PA.

CANADA: Walker Metal Products, Ltd., Windsor, Ontario



Power:

Generator installations will continue trend set in '55.

Harllee Branch, Jr.
President
Edison Electric Institute

The year 1955 fittingly set new standards for the postwar decade of great, solid and accelerating growth by the electric industry by producing remarkably high generation and sales records and generating installations, which, with other growth factors, made it possible for the industry to substantially exceed its past record of approximately doubling in size every ten years.

Highest Postwar Year

Electricity generation by all components of the electric utility industry totaled 545 billion kwhr, an increase of 73 billion over 1954. Electricity sales totaled 479 billion kwhr, up 68 billion over 1954. Percentage-wise the increases were 15.5 pct for generation and 16.6 pct for sales. In both cases quantity and percentage increases were the highest for any postwar year.

Industrial Generation Up

Generating capability reached 120 million kw by the end of the year. The 12½ million added during 1955 broke all annual installation records and brought generating capability up 11.6 pct over 1954. In addition to generation by the electric utility industry, another 78 billion kwhr were produced by industrial and railway plants bringing the grand total to 623 billion kwhr generated in the United States, an amount representing better than 40 pct of all electricity produced on the globe.

In addition to the atomic power plant of Duquesne Light Co. now under construction, five other such plants have been planned.

Mr. Branch is president, Georgia Power Co.

WHAT'S AHEAD

Scales:

Increase of 10 pct in sales foreseen for '56.

Arthur Sanders
Executive Secretary
National Assn. of Scale Mfrs., Inc.

New scale demand and output in 1955 reached the highest level in history. The volume for 1956 looks promising enough to forecast a 10 pct increase. The substantial upturn started in the fourth quarter of 1954, after a gradual decline from the first of 1952. Throughout 1955, scale manufacturers have made optimistic predictions for a year ahead, as well as for 1955. The figures for 1955 have certainly confirmed their predictions. Scale volume in 1955 was 12 to 15 pct above that of 1954.

New adaptations and uses of scales in industrial processing have caused a 10 pct, or more, expansion of this segment of the scale industry. In addition to facility expansion to meet the increased demand for current types of scales, new facilities were required to manufacture scales of the newer load cell and electronic principles.

Scrap:

Expanded domestic consumption seen with drop in exports.

Edwin C. Barringer
Executive Vice-President
Institute of Scrap Iron & Steel, Inc.

Domestic consumption of purchased or open market scrap in 1955 approximated 32 million gross tons—a substantial increase over the 22,400,000 tons of 1954.

Exports in 1955 at about 4,450,000 gross tons were sharply higher than the 1,345,000 tons exported in 1954. The previous record year of domestic consump-

Michigan
Electric Resistance WELDED
STEEL TUBING
Always makes possible Better products at lower Cost

Automotive Steering Wheel
HEIGHT
LOCKING DEVICE

This tubular device, fabricated by Michigan for a major automobile manufacturer, enables the driver to raise or lower a steering wheel and lock it into the exact elbow position he requires for greatest driving comfort.

A hand nut on the locking sleeve is turned counterclockwise one-half and locked at the desired height by a one-half clockwise turn.

The utmost dimensional accuracy is required for this intricate part, which requires a multiplicity of exacting operations for smooth, reliable functioning. It is still another example of the ability of Michigan engineers and production workers to meet the needs of product manufacturers for difficult tubing fabrications produced in volume at low cost.

You are invited to check the dimensions in the drawing at the right. It illustrates the type of problems that our engineering staff is always prepared to solve for Michigan customers.

We will welcome the opportunity to place at your disposal the many years of design and production skills that make Michigan tubular products so superior, so dependable, so economical.

ROUND
¼" to 8" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
½" to ¾"	16 thru 22	
⅞" to 1"	11 thru 22	⅞" minimum side to 5" maximum side
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I.D. and O.D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.
THE OLDEST NAME IN ELECTRIC
Nearly 40 Years in the Business
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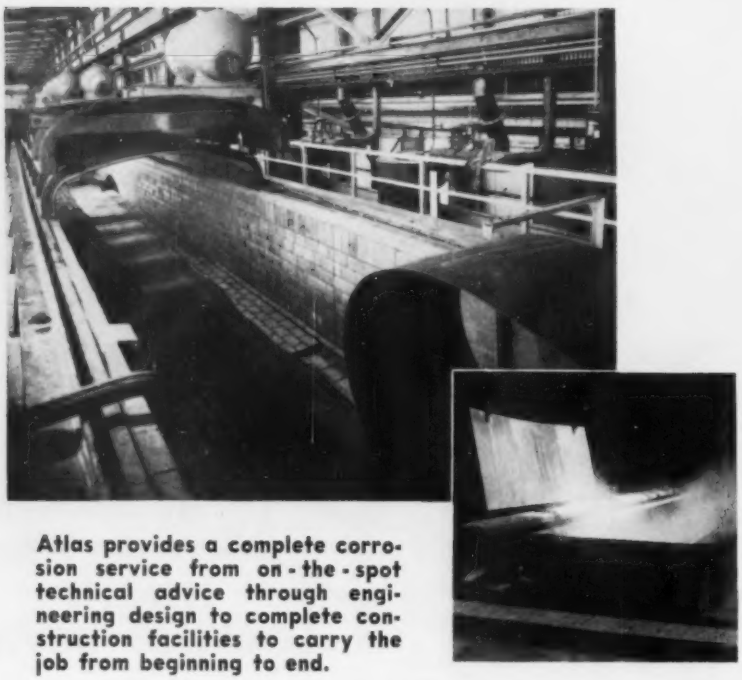
DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—Service Steel Div., Van Pelt Corp., Los Angeles, Calif.—Donald A. Harston, Cleveland, Ohio—Globe Supply Co., Denver, Colo.—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—William P. Hall & Associates, Dayton, Ohio

ATLAS PICKLING TANKS
in service to stay



Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

When you install pickling tanks, you have a right to expect them to deliver service in full measure. You can't get it if these units are the cause of lost production due to down time for repair of corrosion damage.

Pickling tanks of Atlas construction reduce down time to a minimum, because Atlas cements, coatings and linings are designed to handle the rugged abuse of modern pickling.

For a quarter century Atlas has been producing Corrosion-Resistant materials of construction for industry-wide use in combatting corrosion. Atlas, with the advance of technical knowledge, has developed new materials and improved existing products to keep pace with the increasing use of strong pickling agents and higher processing temperatures.

Now Atlas can offer the most complete line of quality corrosion-proof materials available. Your pickling tanks will become a permanent asset when you make sure that ATLAS CORROSION-PROOF CEMENTS, COATINGS, and LININGS are specified.

Write for your copy of Atlas Bulletin CC#3 containing informative data on the complete Atlas line.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

tion and exportation of purchased scrap was 1951 at 34 million gross tons. Therefore, 1955 set a new high record by about 7 pct.

This record was established only by the substantial gain in exportation because proportionately greater use of pig iron, home scrap, and industrial scrap depressed the demand for strictly obsolescence scrap to a marked degree.

Exports Expected to Drop

In 1956, domestic consumption should expand, perhaps one million tons, while exports, after increasing early in the year, will decline to a total of about 3,500,000 tons for the year.

What little capital expansion occurred in 1955, took place in the modernization of conveyor equipment and installing large presses.

Screw Machining:

Outlook good for '56 pending steady demand for durables.

Orrin B. Werntz
Executive Vice-President
National Screw Machine Products Assn.

The 1955 shipment volume of screw machine products was more than 25 pct over 1954 but still under 1953.

Inquiries still remain at good levels. Shipments kept up with new orders in 1955 so that backlogs have not greatly increased. Any sudden drop of inquiries in the first quarter this year will very quickly lead to curtailment in industry shipments.

Nevertheless, if industry should continue at about current levels, in dollars this would be about double the 1946-1949 average for at least the first quarter. Prospects for the balance of 1956 are dependent on the demand for consumer durables with emphasis on the automotive, construction, household appliance and electronics industries.

"I never knew BRISTOL BRASS makes phosphor bronze, too"

This chance remark gave us a feeling that we may have been keeping a secret unintentionally. So for the public record: Bristol makes *everything* that can be made from copper, and makes it in that special way called "Bristol-Fashion" . . . *including phosphor bronze that nobody can top.*

In fact, our customers tell us that Bristol Phosphor Bronze is consistently dependable in its surface smoothness and hardness . . . in its resistance to fatigue and corrosion . . . and in its excellent behavior under forming and machining. They don't tell us in those exact words, but in the form of repeat orders, year after year.

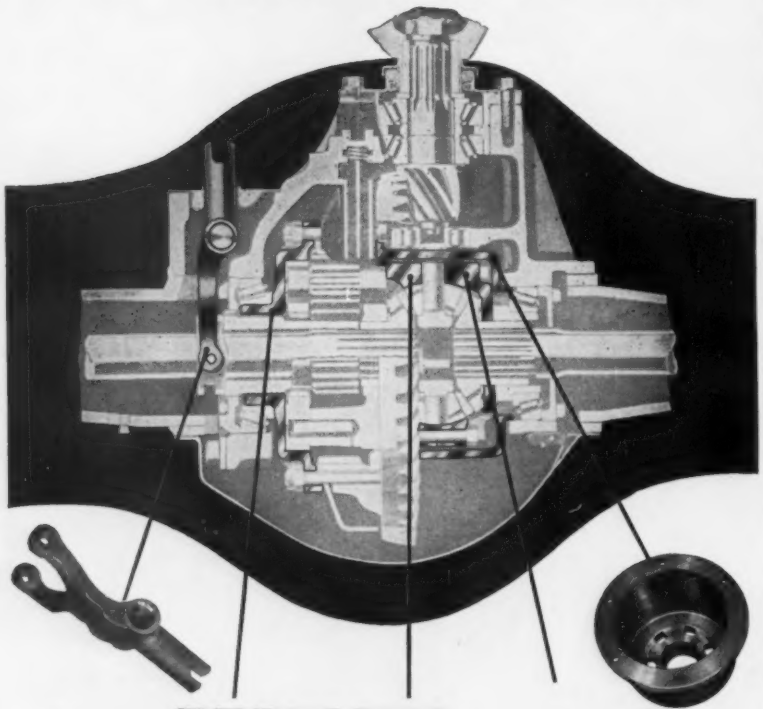
Yes, Bristol makes phosphor bronze strip in all standard sizes. How are *you* fixed? Write, or phone Bristol, Connecticut, Ludlow 2-3161.

THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

for HEAVY DUTY service



PEARLITIC MALLEABLE CASTINGS

The 2-speed truck axle is a *must* under varying load and road conditions because it provides a tailor-made ratio for every condition. But it takes a severe beating under heavy duty conditions encountered in logging, mining, farming, etc.

That's why Eaton Manufacturing Company, leading producer of 2-speed axles, specifies pearlitic malleable — from National — for several vital parts. For Eaton knows that pearlitic malleable has high ultimate strength . . . resists wear under heavy loads at high speeds . . . possesses excellent non-seizing properties. In addition, pearlitic malleable can be given a smooth finish . . . can be either liquid or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

Look your product over critically. Pearlitic malleable castings—from National—can replace costlier fabrication methods . . . can offer opportunities of reduction in weight, machining and assembly time. AA-1197

Photos: Courtesy Eaton Manufacturing Company

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

Shipbuilding:

Current orders, new building, expected to reverse down trend.

L. R. Sanford
President
Shipbuilders Council of America

Contrary to expectations held last year, the downward trend in shipyard employment has not yet been reversed. However, there are good grounds for belief that this will take place during the coming year. The most recent employment figures maintained by the Shipbuilders Council of America show that the average number of ship construction employees during the third quarter of 1955 was over 21 pct less than the third-quarter average of 1954.

Current orders as well as new construction in prospect should check the decline and employment should commence increasing during the first half of 1956. As of November 1, there was a total of 23 seagoing commercial vessels (of 1000 gross tons or over), aggregating 293,300 gross tons, under construction in all the United States shipyards.

During the past year conditions in the ship repairing industry have tended to improve. The previous downward trend in employment was even reversed in the second and third quarters.

"Shall I pour?"

Stampings:

Volume up 15 pct in 1956 . . .
If mills can provide the steel.

H. A. Daschner
Managing Director
Pressed Metal Institute

Despite many customer delivery problems, metal stampers expect 1956 to be the biggest in the history of their industry. Plant expansions are noticeable both in large and small plants. Addition of great numbers of presses and allied equipment is increasing proportionately.

See 15 Pct Rise

Business prospects for 1956 should be 15 pct over 1955 based upon current calculations. The year 1954 showed an approximate drop in volume of nearly 40 pct from 1953. Volume in 1955 is substantially higher than 1954, but only slightly up over 1953. If the mills can provide steel, the metal stampers can go great guns in 1956.

Highlights of '55

Outstanding events in the stamping industry during 1955 were:

1) Introduction of the world's largest presses to make stamp-formed products.

2) Improvements in cold extrusion techniques of metals.

3) Improved metal quality to enable higher speed production from the faster operating presses.

4) More and more products from stampings than ever before.

Find Growing Use

Metal stampings lend themselves to low cost mass production, so they are finding increased use in such products as automobiles, home appliances, TV and radios, office furniture, business machines, sporting goods and toys, heating, plumbing and air conditioning units, boats and motors.

thumbs down
on high handling costs

A Conco Crane, custom-designed for a specific application, can cut costs sharply. A modest crane investment can return important profits. Let a Conco engineer show you how. Write for a representative to call, or ask for Bulletin 3000A covering the complete Conco Crane line—a line backed by 37 years experience.

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for a
better product
start with
BETTER
STAINLESS STEEL STRIP
SPECIFY
WALLINGFORD
Modern machines, advanced atomic and electronic quality control devices and quality-conscious personnel make WALLINGFORD STAINLESS STEEL STRIP better . . . and make the manufactured product better.
Better strip means better output, too. WALLINGFORD STAINLESS STEEL STRIP gages uniformly, draws easily, punches cleanly . . . to reduce spoilage and tool costs.
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A visit to our offices and plant will convince you that Wallingford quality is unmatched.
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STEEL CO.
WALLINGFORD, CONN., U.S.A.
STAINLESS • ALLOY • HIGH CARBON • LOW CARBON
STRIP • STAINLESS WELDED TUBES AND PIPE

Standards:

Program doubled since 1948 . . . Industrial standardization up.

G. F. Hussey, Jr.
Managing Director
American Standards Association, Inc.

At no time in history has standardization ranked so high on the list of modern industrial and commercial techniques. ASA has seen at close hand the impact of standards on dollar savings in procurement, manufacture and distribution; on improving health and safe working conditions; on the production of more and better goods at less cost. In 1955 the number of American Standards reached 1500, influencing nearly every segment of our economy.

Savings Substantial

Among new projects brought to ASA in 1955 have been proposals for dimensional standards for the $25 million plastic pipe industry; safety standards for lawn mowers; standards for automobile safety belts; and standards for low pressure centrifugal pumps estimated to save $6,800,000 a year.

Many New Standards

Newly-approved and revised American Standards have covered:

1) A safety code for elevators to include completely automatic types.

2) Standards for smaller hearing aid batteries with greater lasting qualities.

3) Data on interference on TV receivers and standard nomenclature for antenna and waveguide terms.

4) A safety standard for printing presses. Up to December 1st, ASA acted on 140 new and revised American Standards in 1955.

Steel Castings:

Production rate this year will probably exceed 1955 record.

F. Kermit Donaldson
Executive Vice-President
Steel Founders' Society of America

At the present time, the indicated demand for steel castings in 1956 is excellent and the industry will probably operate at a rate in excess of that for 1955. Greatly increased purchases of railway freight cars, as well as the increases in the manufacture of producers durable equipment, have more than doubled the backlog of orders for steel castings compared with the same period in 1954. 1955 production will probably exceed that of 1954 by 20 to 25 pct.

Progress Keeps Pace

Among the outstanding events in the industry in 1955 have been the promulgation of a Recommended Minimum Standard covering steel castings; the development of data covering the fatigue endurance limits of cast steel—which indicates that cast steel is comparable in every respect with wrought steel; and many new developments in molding, cleaning, finishing, and inspection processes. Research now under way will bring higher quality.

"Oh, it's sort of expected of us I guess."

RESEARCH AT WORK FOR YOU

CHIEF SANDUSKY

FERROUS AND NON-FERROUS CENTRIFUGALLY CAST ROLLS, SLEEVES, TUBES, LINERS, CHUTES, RETORTS, RINGS, BUSHINGS, BEARINGS, ETC.

Many concerns are discovering strong, uniform, closely grained Sandusky centrifugal castings are essential to applications requiring maximum strength and extreme resistance to heat, corrosion, and abrasion. Chief Sandusky continuous research is ever expanding the range of these uses.

This versatility and quality results from constant research and testing in our modern firm and independent laboratories. Vast foundry and field experience also assists in supplying the proper castings for you.

Excellent machining facilities for drilling, turning and boring are available.

Call or write Sandusky, the leading source of ferrous and non-ferrous centrifugal castings. ALWAYS SPECIFY CHIEF SANDUSKY.

C. M. Lovsted & Co., Seattle, Wash. • Tynes Bros., Birmingham, Ala. • Cordes Bros., San Francisco and Wilmington, Calif.

Chief SANDUSKY CENTRIFUGAL CASTINGS
FERROUS AND NON-FERROUS
SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

DELIVERY OFF THE SHELF

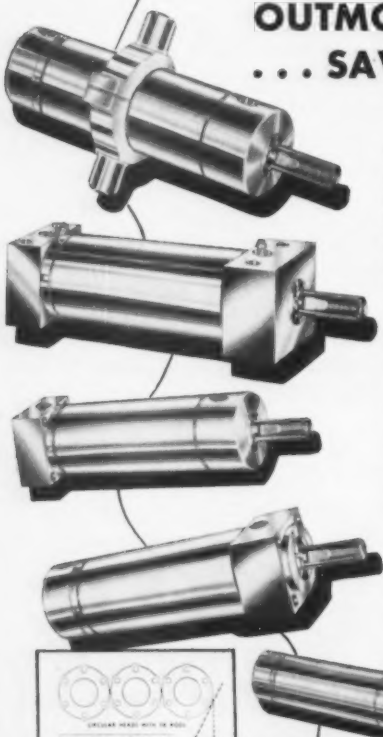
IN 64,000 COMBINATIONS

T-J

Spacemaker

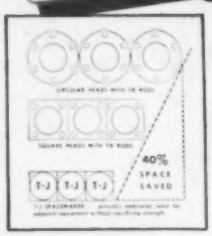
CYLINDERS

OUTMODE ALL OTHERS ... SAVE 40% SPACE!



You'll never go back to tie-rod cylinders, once you apply T-J Spacemakers to your push-pull-lift jobs! Advantages in space saved, weight saved, greater strength and off-the-shelf delivery are among the dozens of Extras you get as Standard!

Now—these sensationally popular T-J Spacemaker Cylinders are available off the shelf *in sizes up to 8".* This means as many as 64,000 different combinations of styles, bores, strokes, mountings, etc., *immediately available!* Oil pressure to 750—Air to 200 P.S.I. Super Cushion Flexible Seals for Air ... New Self-Aligning Master Oil Cushion. Hard chrome plated bodies and piston rods (Standard). Only from T-J can you get these new ingenious cushion designs! Send for bulletin SM-155-2. The Tomkins-Johnson Co., Jackson, Michigan.



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T-J TOMKINS-JOHNSON

VALVES... AIR AND HYDRAULIC CYLINDERS... CUTTERS... CLINCHERS

Steel Containers:

Predict 10 pct production increase in '56 over '55.

Livingston Keplinger
President
Steel Shipping Container Institute

Production of steel shipping containers during the coming year will follow, proportionately, the general course of national industrial distribution.

Estimates for 1955 put production well over the 100-million unit mark. Shipments of the three major types of containers for last year are estimated at: 18 gage and heavier drums — 24 million; 19 gage and lighter drums—8.5 million; pails—72 million. Shipments in 1954 were: 18 gage and heavier drums—22 million; 19 gage and lighter drums—7.7 million; pails—67 million.

See Higher Output

Based on historical data and estimates of the national economy issued by United States Government offices, probable production for 1956 will be: 18 gage and heavier drums—24.5 million; 19 gage and lighter drums—9.5 million; pails—80 million; or well over 110 million units.

Container production future depends on demand for sheet steel and its growing shortage.

"You've got to hand it to him, he sure is handy."

Structurals:

Backlogs and bookings up on fabricated structural steel.

Earle V. Grover
President
American Institute of Steel Construction

Demand for fabricated structural steel for construction purposes in 1956 is expected to be even higher than in 1955. Shipments of this important construction material are expected to exceed the level reached in 1955.

Several economic signposts point to this improvement. Forecasts of construction volume reported annually by trade and government sources indicate an over-all increase of at least 3 pct in 1956. Even greater increases are expected in some areas of construction using heavy tonnages of fabricated structural steel. Both statistical reports of backlogged orders on hand and future order bookings received as compiled by the Institute show substantial increases over a year ago.

Supplies Were Short

Because of difficulties in getting adequate tonnages of plain material, shipments of fabricated structural steel in 1955 dropped to about 2,700,000 tons, compared with 2,948,000 tons in 1954. Despite this decline, 1955 total approximated that shipped in 1951 and again in 1952.

Bookings of new orders during 1955 were about 3,400,000 tons—the highest since 1929 and 35 pct above the 2,510,000 tons booked in 1954. An equally significant trend in the fabricating industry during 1955 was the steady rise in total backlog of structural steel orders on hand during each month of the year.

Mr. Grover is president, Apex Steel Corp., Ltd., Los Angeles.

STOOLS

- weighing 10,000 pounds each
- alloyed 25% Cr—12% Ni
- for 1750°F. temperatures

DURALOY

These stools should offer a very pertinent tie-in with your casting requirements. Essentially, they are alloyed to resist heat. They're typical of the heavy high alloy castings we are equipped to turn out.

They will serve also to indicate what we can do in the way of producing castings to resist not only high temperatures but severe corrosion or combinations of heat and corrosion, as well.

Today, we can offer several distinctly different types of castings in the high alloy field including static, centrifugal and shell-molded.

Many in both the metal working and processing fields have come to look upon Duraloy as the leading producer of exclusively high alloy castings. This reputation has been built on many years production of sound castings properly alloyed. We'll be glad to discuss your high alloy casting requirements.

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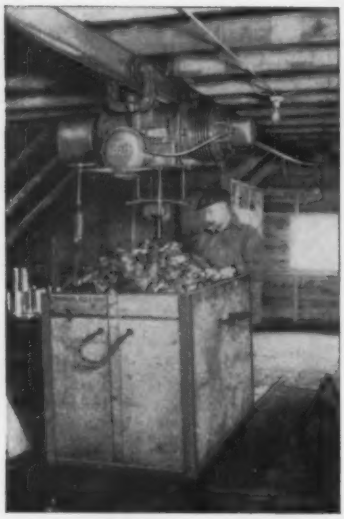

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Operator primarily occupied with other duties. Uses hoist for fast, efficient handling of relatively short hauls.

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Operator in cab moves loads along at high speeds, occupies best vantage point for spotting and stacking material.

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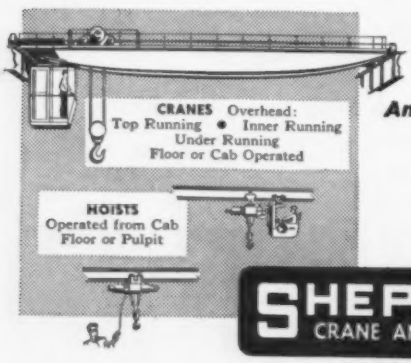

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Tin:

Surplus will be cut as demand for tinplate, solder grows.

Robert J. Nekervis
Chief Metallurgical Engineer
Tin Research Institute, Inc.

Decisions will be made soon which may radically affect the tin market. The futures of the U. S. strategic stockpiling program, the International Tin Agreement, and the operation of the Texas tin smelter have to be settled. Most important is what is to become of the 23,000 tons of tin (roughly 14 pct of annual world production) now absorbed in the American strategic stockpile.

If this amount of tin is freed to the market, it becomes a question of whether the regulation plan of the International Tin Agreement will be in a position to deal with this, or any smaller surplus of production over consumption that may make itself felt next year.

Tinplate Demand Up

Smaller surpluses are envisioned because the consumption picture next year looks bright. An important feature of the world position is the steadily increasing demand for tinplate, which now accounts for 62 pct of U. S. consumption and 43 pct of world consumption. It seems likely that next year will surpass current record levels as food canners add new products to the traditional ones.

New Uses For Tin

The second largest tin-consuming product, solder, also seems to have a bright future. Its use in printed circuits in the radio, television, and electronic industry has set records in the past nine months.

New uses for tin-nickel, tin-copper, and tin-zinc electrocoatings, and for the new high tin-aluminum bearing alloys (20 to 30 pct tin) may also help relieve the impending surplus.

WHAT'S AHEAD

Tooling:

Continued advances foreseen during current year.

Harry E. Conrad
Executive Secretary
American Society of Tool Engineers

The present pace of rapid technological development has prompted many to note that we are in our Second Industrial Revolution. The huge strides made in the past year in our industry would certainly seem to verify this.

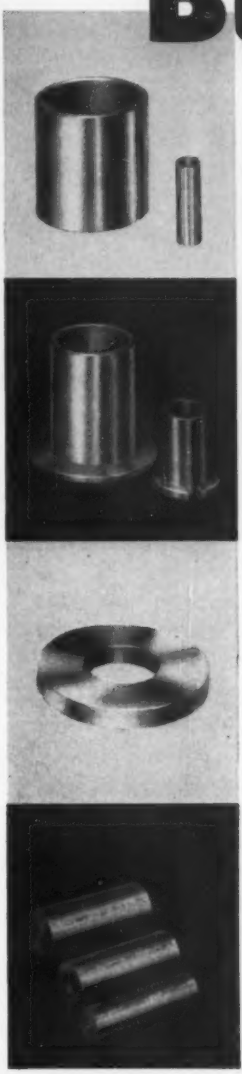
Ceramic Tooling Available

And there is every indication that new developments will be on the increase during the next year. Ceramic tooling, for example, was a virtual novelty at the beginning of 1955. Now we find that it will be commercially available in January and it promises to be one of the finest tooling developments in cutting tools since the introduction of carbides.

One of the most significant sources of ideas for industry this year will be the ASTE Industrial Exposition next March in Chicago. There the tool engineer will be able to see in action and compare various approaches and solutions to his problems, all under one roof.

"I think it's nervous. I shake like that when I get that way."

NOW YOU CAN HAVE
Bunting®



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Manufactured in Bunting's own factory these Sintered Powdered Bronze Bearings represent a high point in sintered bronze quality and precision.

The Bunting line of Sintered Powdered Bronze bearings provides a wide range of sizes including all A.S.T.M. recommended sizes, tolerances and standards. The composition of the Bunting Sintered Bronze Stock line is copper 90%, tin 10%.

Bunting Industrial Distributors have stocks of these Bunting Sintered Powdered Bronze bearings. Ask your Bunting Distributor or your nearest Bunting Branch for catalog P-56 or write.

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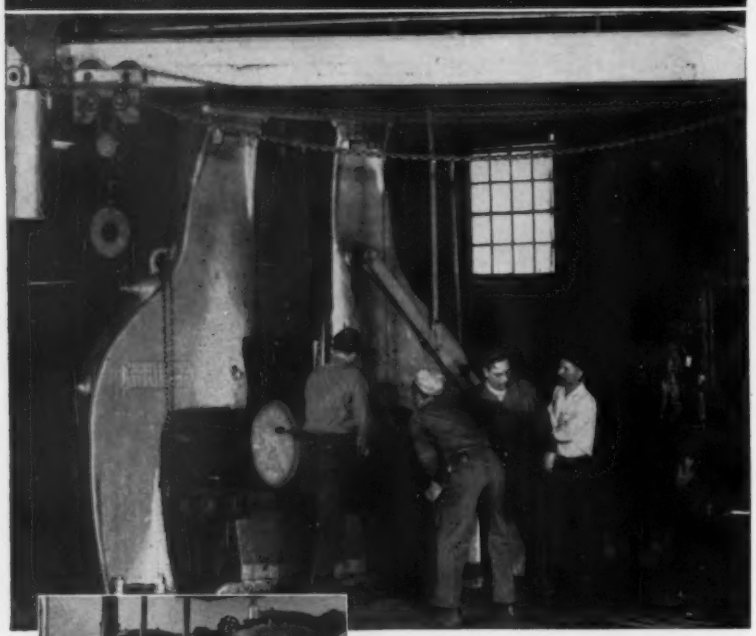
DEMING PUMPS
help make forgings...



Above view shows the two Deming Vertical Pumps installed at the McInnes Steel Company, Corry, Pennsylvania.

● Powerful forge machines produce steel forgings at the McInnes Steel Company, Corry, Pa. These machines are operated by steam power at 135 lbs. pressure.

Two Deming Vertical Pumps, working alternately, supply water for the boilers. Dependable, low cost operation and easy accessibility for maintenance make these compact Deming Pumps ideal for boiler feed service.

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Truck-Trailers:

Growing suburban population booms highway transport.

R. R. King
President
Truck-Trailer Manufacturers Assn.

Final figures are not in, but it is virtually certain that production of truck-trailers will shatter all dollar value records in 1955, with a total near $360 million. This 42 pct increase over 1954 dollar value reveals the industry to be in a healthier-than-ever condition. Estimated production of 78,500 units last year also represents a 42 pct increase over 1954 output of 55,399 units.

If our economy remains healthy, the truck-trailer industry will probably produce from 75,000 to 85,000 units again this year.

Population Is Factor

Last year's outstanding truck-trailer production results from two major factors. The first is a demand for more highway transport, generated by a U. S. population that has soared to over 165 million. Of the 95 million Americans who live in greater metropolitan areas, a steadily increasing number have migrated to suburbs where their daily needs are frequently supplied over the highways.

"Put it in the Rush basket. Hardly anybody bothers to look there."

The second factor is the development within the last two years of the new, high-cube van-type trailer which has accelerated the replacement market. There is no accurate way to determine to what point this demand for high cube has been met. However, it is evident that the demand will go on for at least one more year, and probably two.

Mr. King is president, American Body & Trailer, Inc., Oklahoma City, Okla.

Welding:

Atomic age, automation promise record growth for welding.

J. H. Humberstone
President
American Welding Society

Despite many accomplishments within the past decade, welding is only on the threshold of its potential for industry. It has been suggested that less than half of what could be welded is being welded today. This suggests the tremendous growth and prosperity that lies ahead, along with the fact that welding is the essential fabrication process in the limited field of nuclear development.

More immediately—in 1956—

"You'd be surprised how it cuts down on manhours."

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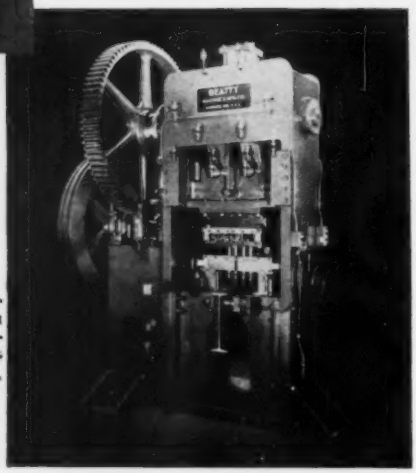
GUILLOTINE BEAM WEB PUNCH
Six individually controlled punching units with automatically synchronized punch and die, facilitate setting up to various gauge lines. 33" max. setting to outside units; 2⅜" min. setting between units. 200 ton cap.

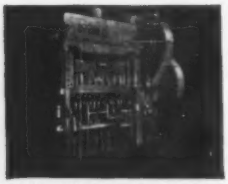
GUILLOTINE BEAM FLANGE PUNCH
A turn of a handwheel changes punching centers and synchronizes punch with die. Four punching units, with 2¼"-6¾" setting between inside and outside punches, adjustable 2¼"-3½". 200 ton cap.

FASTER
WEB and FLANGE PUNCHING

Beatty Built-in Adjustable Tools Save Set-up Time



BEATTY Spacing Table handles web and flange punching without roll adjustment.



BEATTY Guillotine Beam Punch. Punches webs and flanges in "I" beams from 6 to 30 inches.

REDUCE COSTS ON "SHORT-ORDER" PUNCHING

Take the high costs out of "short order" punching with these versatile BEATTY Guillotine Beam Punches. They're especially designed to reduce costs in handling short run web and flange punching where punching arrangements are frequently changed.

Incorporating entirely new time-saving *adjustable* tools that eliminate expensive setting up time, reduce down time . . . these BEATTY machines have lowered costs by as much as 75% on some metal fabricating jobs.

Dependable, accurate fast . . . BEATTY machines (standard models or custom-built to your specifications) can help solve your metal fabricating problems — reduce costs. Talk it over with a Beatty engineer!

BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.

BEATTY Guillotine Bar Shear for angles, bars, rounds squares without changing tools.

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MACHINE & MFG. CO.
HAMMOND, IND.

there will be an unparalleled demand for the products, processes, and services of our industry. This demand will be based on a general prosperity and on developments within the welding field itself.

The consumption rate of welding products continues to increase at a rate in excess of general business activity. Reasons for this significant trend are found in welding developments. For one thing, welding's adaptability to mechanization and automation has exceeded expectations. The process also shows a surprising versatility of application on a wide range of metals once considered hard to weld.

Many New Developments

We are finding out that the alleged inherent limitations of welding may not be inherent at all. In support of this are (1) developments in machine welding; (2) the ever-increasing expansion in the use of inert-gas processes; (3) the improvement of welding machines; (4) the use of brazing materials operating at high temperatures; (5) the emergence of brazing as a high production tool; (6) the development of low hydrogen type electrodes, with and without iron powder coating.

In addition, preparation of flame-cut weldments through the use of shape-cutting machines with elec-

"Always, Johnson, a steel reinforced concrete column has the right-of-way."

tronic controls is a growing practice. Industry is progressing into fabrication schemes which require contour beveling and contour welding—calling into play the synchronized use of welding and flame-cutting tools. Thus, the years ahead promise to be consecutive record-breakers for the welding industry.

Mr. Humberstone is president, Air Reduction Sales Co., New York.

Welders:

Automation to play big part in growth of resistance welding.

J. C. Wilson, Jr.
President
Resistance Welder Manufacturers' Assn.

Sales in 1955 of resistance welding machinery slightly exceeded 1954 volume and we estimate further increase in 1956.

Manufacturers of resistance welding machinery look for continued growth in application and utilization of their engineering services, and in welding processes and welding machinery in the next ten years. Everyone agrees that automation of all welding processes as well as other manufacturing processes will proceed at a faster pace in the years immediately ahead.

Resistance welding processes are inherently adaptable to automatic operation.

New Uses Expected

Utilization of resistance welding processes is expected in new manufacturing activities where they have not yet been employed. Even greater growth in our industry in the next ten years may derive from higher degrees of automation to the many and diversified manufacturing activities which resistance welding processes already serve.

Resistance welding machinery

Users of
GEARS
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FROM FAIRFIELD
1. MASS PRODUCTION ECONOMY—Large or small, you get the benefits of high production rates and big volume output at Fairfield—where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY!
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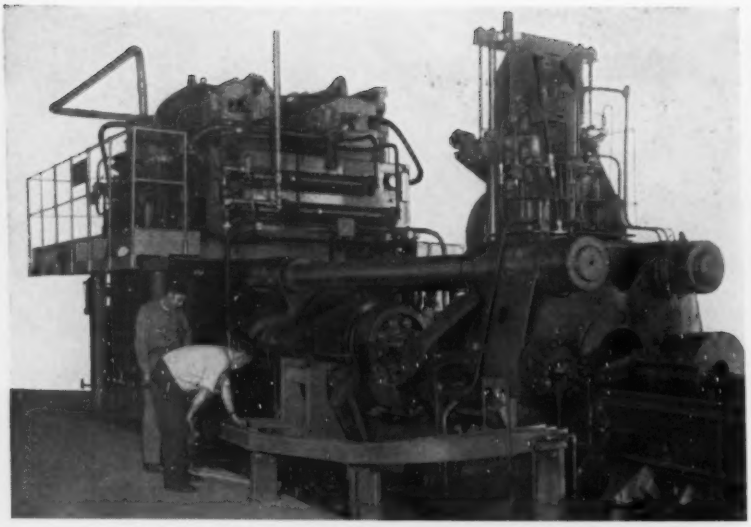


This Loewy Hydropress of 1700-ton capacity is producing beryllium copper rod and bar at speeds and in shapes previously unobtainable.

NOW...BERYLLIUM COPPER IN MORE FORMS AND MORE SIZES

As a result of the increasing demand for beryllium copper in a greater variety of sizes and shapes, The Beryllium Corporation has accelerated its production with a multimillion-dollar expansion program. This program includes new equipment designed to mass-produce beryllium copper in a wider range of sizes and shapes, and to closer tolerances.

Several major production units have been installed—a new Loewy extrusion press (shown above), a new scarfer, a new spectrometer, and several new precision rolling mills.

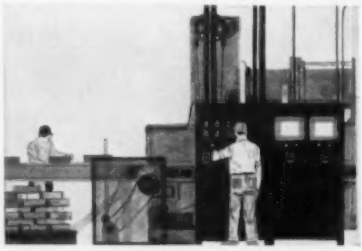
The rotary scarfer, running at the rate of a billet a minute, shaves the outer surfaces of beryllium copper billets prior to rolling.

To insure constant reliable quality control for this large-scale production, a direct reading spectrometer was installed. This unit speeds up billet casting by analyzing metal compositions in less than 5 minutes, as compared with 24 hours in the past.

The new Loewy extrusion press supplements existing hot-rolling facilities and produces seamless tubing and special shapes never before available in production quantities. It will increase production by doubling hot-working capacity—permitting the hot mill to work almost exclusively on strip production.

Cold-rolling capacity has been multiplied by the installation of several new strip mills—one of them a Sendzimir mill—to permit greater dimensional precision in strip sizes.

All of these plant improvements mean that more beryllium copper, in an increased range of sizes and shapes, is now available for large users and new uses.



THIS ELECTRIC ATMOSPHERE CONTROL FURNACE—built to Beryllium's specifications—prevents oxidation by closely controlling temperature.

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cannot be mass produced and distributed as can many other types of production equipment. It must be sold by careful technical application. Machinery must be developed carefully to meet each specific production requirement and installed in production lines for practicable continuous production operation. Technical know-how and experience in welding engineering, metallurgy, electronics, and electrical and mechanical engineering and machine design are and will continue to be at a premium.

Mr. Wilson is president, Acro Welder Mfg. Co., Milwaukee.

Zinc:

1955 slab zinc tonnage breaks all records . . . 1956 tonnage up.

Ernest V. Gent
Executive Vice-President
American Zinc Institute, Inc.

On the basis of the record to date, there is little risk in declaring 1955 a banner year for the zinc industry. Production at United States smelters of primary and secondary slab zinc will likely exceed the million-ton mark, breaking all records and the previous high of 990,000 tons registered in 1943.

Imports To Run High

Imports of slab zinc probably will total about 165,000 tons, approximately 9 pct above 1954, but well below the 203,000 tons recorded in 1953. Domestic consumption (based on U. S. Bureau of Mines reports for the eight months' period ended August 31, 1955) will reach about 1,030,000 tons for the year, 17½ pct above the 1954 figure. In addition, somewhere in the neighborhood of 88,000 tons will likely be credited to 1955 shipments for government

account and about 19,000 tons for export during the current year.

Supply Balances Demand

Statistically, the slab zinc picture is in sound shape. The overall supply is in approximate balance with consumption, with the aid of the current stockpile program. At times Special High Grade zinc has been reported in tight supply, but there is no record of interrupted operations on this account. Smelter stocks were reduced from 124,000 tons on January 1 to 44,000 tons on October 31, 1955.

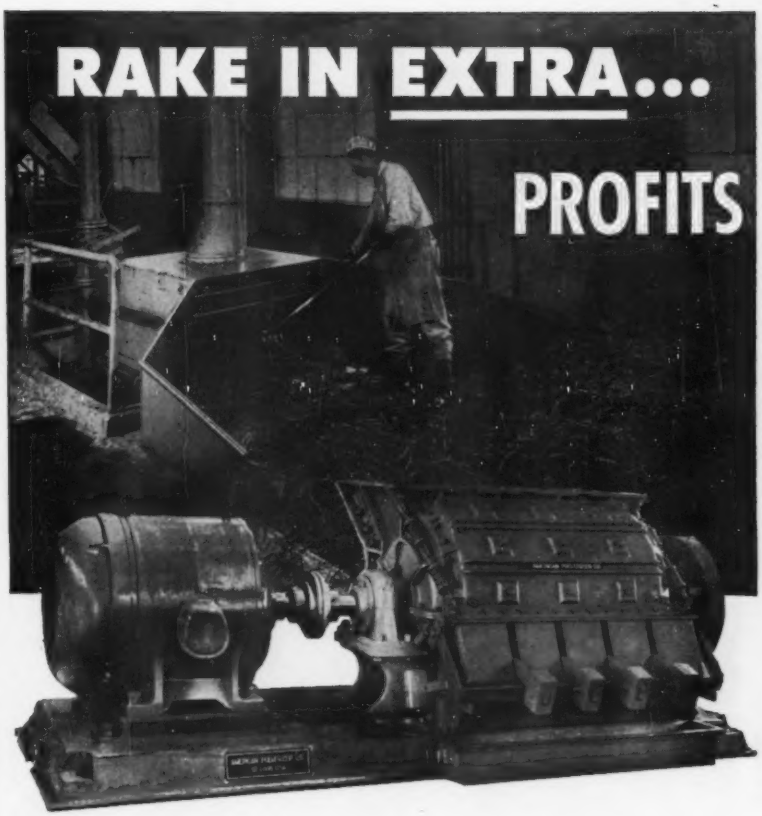
Most spectacular growth in consumption is in die casting. It is estimated that industry will absorb some 380,000 tons of slab zinc in 1955, against 287,000 tons in 1954.

Galvanized Tonnage Grows

Galvanizing too is consuming a great amount of tonnage, with expansion of the continuous sheet and strip lines. At the current rate, 1955 total may reach 430,000 tons, an 8 pct increase over the previous year.

Reports from the automobile and steel industries, as well as from other consuming channels, indicate a continued high demand for zinc in 1956.

"It's a new light weight metal they want us to try—that's all I know."



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METALWORKING MEETINGS FOR 1956

Technical Meetings, Conventions and Expositions on Various Phases of Metalworking and Metal Production

(For January meetings see p. 13)

FEBRUARY

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS—Annual meeting, Feb. 20-23, Hotels Statler and New Yorker, New York. Institute headquarters are at 29 W. 39th St., New York.

ASSOCIATION OF IRON & STEEL ENGINEERS—Western regional meeting, Feb. 20-21-22, Hotel Statler, Los Angeles. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

COLORADO MINING ASSOCIATION—The annual national western mining conference, Feb. 2-3-4, Shirley-Savory Hotel, Denver. Association headquarters are at 204 State Office Bldg., Denver.

INTERNAL COMBUSTION ENGINE INSTITUTE—Annual meeting and selection of officers, Feb. 9, Institute Executive Offices, Chicago. Institute headquarters are at 201 N. Wells Bldg., Rm. 914, Chicago.

MACHINERY & ALLIED PRODUCTS INSTITUTE—MAPI Ninth Conference on Capital Goods Economics, Fourth Session, Feb. 17, 18, The Mayflower, Washington. Institute headquarters are at 1200 Eighteenth St., Washington.

MARCH

AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC.—Annual meeting, March 22-23, Hotel Drake, Chicago. Association headquarters are at 1806 First National Bank Bldg., Pittsburgh.

AMERICAN SOCIETY OF TOOL ENGINEERS—ASTE annual meeting and industrial exposition, Mar. 19-23, International Amphitheatre, Chicago. Society headquarters are at 10700 Puritan Ave., Detroit.

CAN MANUFACTURERS INSTITUTE, INC.—Annual meeting, Mar. 5, New York, N. Y. Institute headquarters are at 60 E. 42nd St., N. Y.

"Sorry dear, I forgot you were on the nightshift again."

MEETINGS

INTERNATIONAL ACETYLENE ASSOCIATION—Annual Convention, Mar. 12-14, Statler Hotel, Los Angeles. Association headquarters are at 30 E. 42nd St., New York.

MACHINERY & ALLIED PRODUCTS INSTITUTE—MAPI Ninth Conference on Capital Goods Economics, Fifth and Reunion Session, Mar. 23-25, The Homestead. Institute headquarters are at 1200 Eighteenth St., Washington.

PRESSED METAL INSTITUTE—Spring Technical Conference, Mar. 14-15-16, Carter Hotel, Cleveland. Institute headquarters are at 3673 Lee Road, Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 19-20, Drake Hotel, Chicago. Society headquarters are at 606 Terminal Tower, Cleveland.

APRIL

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.—Annual Spring Engineering conference, Apr. 4-through Apr. 6, Lehigh University, Bethlehem. Institute headquarters are at 101 Park Ave., N. Y.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS—Annual meeting and exhibit, Apr. 4-5-6, Hotel William Penn, Pittsburgh. Society headquarters are at 84 E. Randolph St., Chicago.

AMERICAN ZINC INSTITUTE, INC.—Annual meeting, Apr. 23-24, Statler Hotel, St. Louis, Miss. Institute headquarters are at 60 E. 42nd St., New York.

ASSOCIATION OF IRON & STEEL ENGINEERS—Annual Spring Conference, Apr. 30-May 1, 2, Lord Baltimore Hotel, Baltimore. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

ELECTROCHEMICAL SOCIETY, INC.—Spring meeting, Apr. 29-May 1, San Francisco (annual). Society headquarters are at 216 W. 102nd St., New York.

INDUSTRIAL TRUCK ASSOCIATION—Spring meeting, Apr. 3-4, Edgewater Beach Hotel, Chicago. Association headquarters are at Washington Loan & Trust Bldg., Washington, D. C.

LEAD INDUSTRIES ASSOCIATION—Annual meeting, Apr. 23-24-25, Statler Hotel, St. Louis. Association headquarters are at 420 Lexington Ave., New York.

MALLEABLE FOUNDERS SOCIETY—7th Market Development Conference, Apr. 12-13, Edgewater Beach Hotel, Chicago. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

METAL POWDER ASSOCIATION—Twelfth annual meeting and 1956 Metal Powder Show, Hotel Cleveland, Cleveland, Apr. 10-12. Association headquarters are at 420 Lexington Ave., N. Y.

METAL LATH MANUFACTURERS ASSOCIATION—Meeting, Apr. 18, 19, Statler Hotel, Buffalo. Association headquarters are at Engineers Bldg., Cleveland.

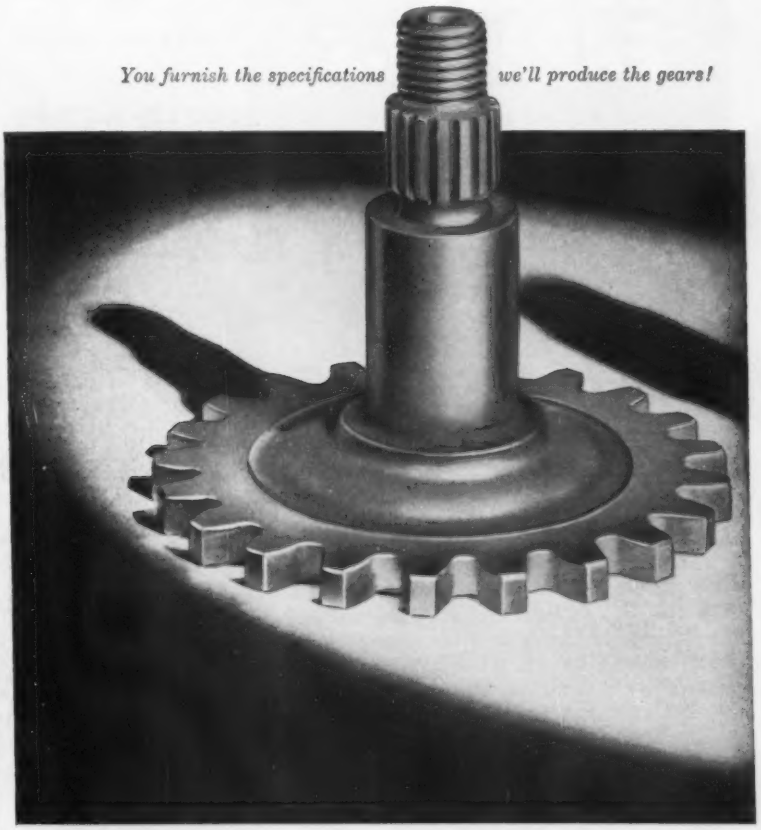
"But it is the truth, Dear . . . three of us guys have to stay late and go through a lot of bar stock."

Perkins custom-made Gears *make any device—big or small, simple or complex—*

more efficient,
more serviceable,
more saleable . . .

because every human and mechanical advantage in Gear Making goes into their production—and all under management who have spent their lifetime in the Gear Business.

You furnish the specifications *we'll produce the gears!*



PERKINS MAKES:
to customers' specifications, in all materials, metallic and non-metallic: bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth.

NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7 1/2x16". A POWER MODEL is available. Information on request.

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103 Circuit Ave., WEST SPRINGFIELD, MASSACHUSETTS

NATIONAL SCREW MACHINE PRODUCTS ASSOCIATION—Annual Industry Meeting, Apr. 4, 7, Hotel Schroeder, Milwaukee. Association headquarters are at 2860 E. 130th St., Cleveland.

RAIL STEEL BAR ASSOCIATION—75th meeting, Apr. 4, 6, Boca Raton, Fla. Association headquarters are at 38 S. Dearborn St., Chicago.

SCIENTIFIC APPARATUS MAKERS ASSOCIATION—Annual meeting, Apr. 8-12, The Belleview-Biltmore, Belleair, Fla. Association headquarters are at 20 N. Wacker Drive, Chicago.

MAY

THE ALUMINUM ASSOCIATION—Summer meeting, May or June. Association headquarters are 420 Lexington Ave., New York.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, INC.—Pacific Northwest Regional Conference, May 3-5, Olympic Hotel, Seattle. Institute headquarters are at 29 W. 39th St., N. Y.

AMERICAN SUPPLY & MACHINERY MANUFACTURERS' ASSOCIATION, INC.—Annual convention, Triple Industrial Supply Convention, May 20-23, Atlantic City. Association headquarters are at 2130 Keith Building, Cleveland.

AMERICAN WELDING SOCIETY—Spring Technical, National & Welding Show, May 7-11, Statler Hotel, Buffalo. Society headquarters are at 33 West 39th St., New York.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Spring Meeting, May 20-23, The Homestead, Hot Springs, Va. Association headquarters are at Associations Building, Washington, D. C.

NON-FERROUS FOUNDERS' SOCIETY—Annual meeting, May 3, Marlborough-Blenheim, Atlantic City. Society headquarters are at 192 N. Clark St., Chicago.

THE WIRE ASSOCIATION—Regional meeting, May 24-25, Kansas City, Mo. Association headquarters are at 453 Main St., Stamford, Conn.

JUNE

AMERICAN ELECTROPLATERS' SOCIETY—43rd Annual convention, June 17-21, Hotel Statler, Washington. Society headquarters are at 445 Broad St., Newark, N. J.

AMERICAN GEAR MANUFACTURERS ASSOCIATION—40th Annual meeting, June 3-4-5-6, The Homestead, Hot Springs, Va. Association headquarters are at One Thomas Circle, Washington, D. C.

AMERICAN STANDARDS ASSOCIATION — International Electrotechnical Commission Annual meeting, June 27-July 6. Delegates will be guests of German National Committee of IEC, Munich. Association headquarters are at 70 East 45th St., N. Y.

INSTITUTE OF APPLIANCE MANUFACTURERS — Annual convention-exhibit, June 4-5-6, Netherland Plaza Hotel, Cincinnati. Institute headquarters are at Shoreham Hotel, Washington, D. C.

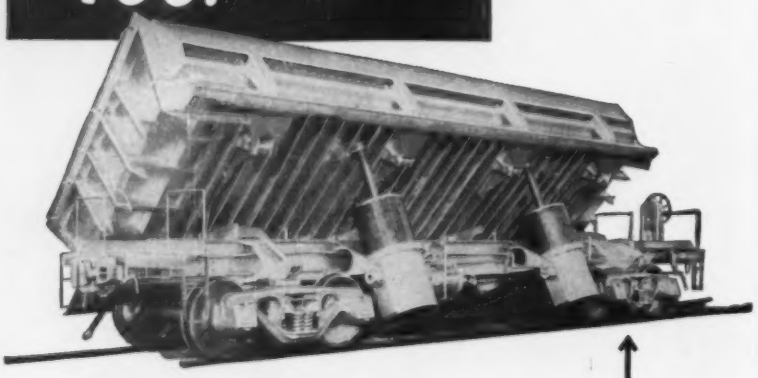
MACHINERY & ALLIED PRODUCTS INSTITUTE—MAPI Annual Washington Conference, June — Hotel Statler, Wash. Institute headquarters are at 1200 Eighteenth St., Wash.

MALLEABLE FOUNDERS SOCIETY—Annual meeting — June 11-12, Homestead, Hot Springs. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

RADIO ELECTRONICS TELEVISION MANUFACTURERS ASSOCIATION — 32nd Annual Convention. Edgewater Beach Hotel, Chicago. Association headquarters are at 777—14th St., N. W., Washington, D. C.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Summer meeting, June. Institute headquarters are at 600 Fifth Ave., New York.

BOOSTS EARNINGS TOO!



The Differential Air Dump Car has a way with operating expenses — cuts 'em down!

There's another pair of massive muscles on the other side of the car, too, means two-way dumping and greater flexibility.

They're built to take rough treatment — whether it's the slam-banging of the clam or the sudden dumping of tons of hot slag. These cars can take it and can come back faster for more.

Higher ratio of payload to dead weight! Fewer trips to the shop and shorter stays when they do go! Add all these up and it spells lower operating costs — another way to say "Boosted Earnings". Write for the full story on these cars.

DUMPS BOTH WAYS

Other Differential Products: Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

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SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

"Perkins! This sideline of yours has got to stop."

JULY

AMERICAN STANDARDS ASSOCIATION—International Organization for Standardization, meeting of the council, July 16, 21, Geneva. Association headquarters are at 70 East 45th St., N. Y.

NATIONAL ASSOCIATION OF SCALE MANUFACTURERS, INC. Annual meeting, third Monday and Tuesday of July. Association headquarters are at One Thomas Circle, Washington.

TRUCK - TRAILER MANUFACTURERS ASSOCIATION—Annual Summer meeting, Eighth, July 23, date not yet definite, Edgewater Beach Hotel, Chicago. Association headquarters are at 710 Albee Building, Washington, D. C.

SEPTEMBER

AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC. — Semi - Annual meeting, Sept. 19-21, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters are at 1806 First National Bank Bldg., Pittsburgh.

ASSOCIATION OF IRON & STEEL ENGINEERS — Annual convention, Sept. 25-26-27-28, Cleveland Public Auditorium, Cleveland. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

ELECTROCHEMICAL SOCIETY, INC.—Fall meeting, Sept. 30, Oct. 4, Pittsburgh, (Semi-Annual). Society headquarters are at 216 W. 102nd St., New York.

INDUSTRIAL TRUCK ASSOCIATION—Fall meeting, Sept. 24-25-26, Greenbrier Hotel, White Sulphur Springs, West Va. Association headquarters are at Washington Loan & Trust Bldg., Washington, D. C.

INSTRUMENT SOCIETY OF AMERICA —11th Annual Instrument - Automation Conference and Exhibit, Sept. 17-21, Coliseum, New York City. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

STEEL FOUNDERS' SOCIETY OF AMERICA—Fall meeting, Sept. 24-25, The Homestead, Hot Springs, Va. Society headquarters are at 606 Terminal Tower, Cleveland.

OCTOBER

AMERICAN GAS ASSOCIATION—Annual convention, Oct. 15-19, Atlantic City. Association headquarters are at 420 Lexington Ave., New York.

AMERICAN GEAR MANUFACTURERS ASSOCIATION—Semi-Annual meeting, October 28-29-30-31, The Edgewater Beach Hotel, Chicago. Association headquarters are at One Thomas Circle, Washington, D. C.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, INC.—Fall meeting, Oct. 8-10, Carter Hotel, Cleveland. Institute headquarters are at 29 W. 39th St., New York.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, INC.—Institute of Metals Division, Oct. 8-10, Allerton Hotel, Cleveland. Institute headquarters are at 29 W. 39th St., N. Y.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Third Annual ASME/ASLE Lubrication Conference, Oct. 8-9-10, Chalfonte-Haddon Hall, Atlantic City. Society headquarters are at 84 E. Randolph St., Chicago.

AMERICAN SOCIETY FOR METALS—Annual meeting, National Metal CONGRESS & EXPOSITION, Oct. 8-12, Cleveland Public Halls, Cleveland. Society headquarters are at 7301 Euclid Ave., Cleveland.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC. — Annual convention, Oct. 28-through Nov. 1, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 101 Park Ave., N. Y.

AMERICAN STANDARDS ASSOCIATION—Seventh National Conference on Standards—sponsored by ASA in conjunction with its 38th Annual meeting, October 22-23-24, Hotel Roosevelt, N. Y. Association headquarters are at 70 East 45th St., N. Y.

AMERICAN WELDING SOCIETY—Fall Technical, Oct. 8-12, Cleveland Hotel, Cleveland. Society headquarters are at 33 West 39th St., N. Y.

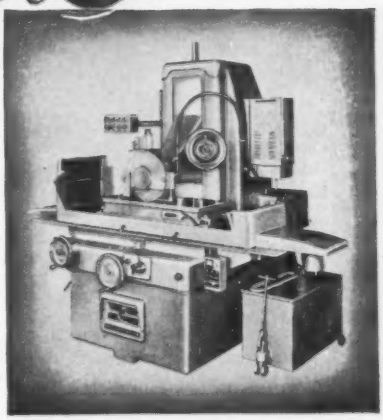
CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION—23rd Annual meeting, Oct. 20-23, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at No. 1 Thomas Circle, Washington, D. C.

"Tell me, Bronski, just what is the secret of your department's fantastic rise in production?"

FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

GRAND RAPIDS GRINDERS

The makers of these famous tractors and allied heavy-duty equipment use Grand Rapids Grinders in their toolrooms. In fact, you'll find Grand Rapids Grinders wherever manufacturers place a premium on precision . . . because they're designed and built for lifetime precision grinding. Take our Model 560, shown at right. Its column and base are a massive, one-piece casting for permanent, rigid alignment. Wheel head has powered rapid vertical travel; cross feed and longitudinal travel table are hydraulically actuated. Table speed is variable up to 140 fpm, making this the *fastest* grinder of its type and size!
If you're not already enjoying these standout features in your toolroom, a note on your letterhead will bring full details.



Grand Rapids No. 560 Hydraulic Feed Surface Grinder. Table speed up to 140 fpm. Working surface of table is 14" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1800 and 2140 rpm.

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THIN STRIP

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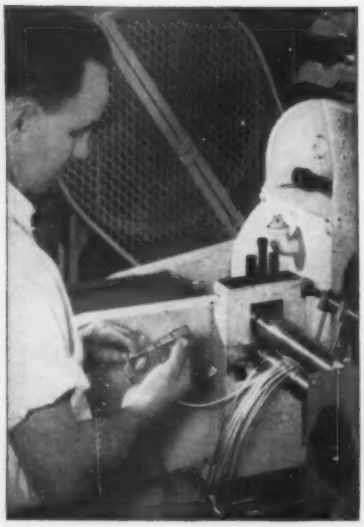

Not one strip rolling requirement in ten need be carefully "miked" to assure close width tolerance.

But that exceptional job is routine with Somers THIN STRIP. Monel, pure Nickel and Nickel alloys are rolled to within ±5% from .010" to .00075", with the same degree of accuracy in widths, and with the exact properties required by your product.

Modern rolling, annealing and precision control equipment assure uniform high quality under the most rigid specifications.

And Somers 40 years experience in a wide range of applications is available to help solve your strip problem without obligation.

Write for confidential data blank or field engineer.

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WATERBURY, CONN.

MEETINGS

GRAY IRON FOUNDERS' SOCIETY, INC.—Annual meeting, Oct. 30-Nov. 2—The Homestead, Hot Springs, Va. Society headquarters are at 930 National City-E. 6th Bldg., Cleveland.

SOCIETY FOR NON-DESTRUCTIVE TESTING — 16th Annual convention, Oct. 8-12, Cleveland. Society headquarters are at 1109 Hinman St., Evanston, Ill.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Fall meeting, October. Institute headquarters are at 600 Fifth Ave., New York.

THE WIRE ASSOCIATION—Annual convention, Oct. 29, Nov. 1, Pittsburgh, Pa. Headquarters are at 453 Main St., Stamford, Conn.

NOVEMBER

SCIENTIFIC APPARATUS MAKERS ASSOCIATION— Midyear meeting, Nov. 8-10, The Homestead, Hot Springs, Va. Association headquarters are at 20 N. Wacker Drive, Chicago.

SOCIETY OF PLASTICS ENGINEERS, INC. — Atlantic Region Conference — Nov. 16, Statler Hotel, New York City. Society headquarters are at 531 Security Bank Bldg., Athens, Ohio.

STEEL FOUNDERS' SOCIETY OF AMERICA — Technical & Operating Conference, Nov. 7-8-9, Carter Hotel, Cleveland. Society headquarters are at 606 Terminal Tower, Cleveland.

DECEMBER

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, INC.—Electric Furnace Steel Committee Dec. 5-7, Morrison Hotel, Chicago. Institute headquarters are at 29 W. 39th St., New York.

INDUSTRIAL TRUCK ASSOCIATION—Annual meeting, Dec. Statler Hotel, New York City. Association headquarters are at Washington Loan & Trust Bldg., Washington, D. C.

INSTITUTE OF APPLIANCE MANUFACTURERS — Year-end conference, Dec. 3-4, Netherland Plaza Hotel, Cincinnati. Institute headquarters are at Shoreham Hotel, Washington, D. C.

"I've had my eye on you, Kooser, and let me say I like the way you get around the plant.

Somers

UNIGRAIN®

thin strip brass for deep drawing

Uniform fine grain size of Somers eyelet brass—less than .010 mm. (75X).

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Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010" and .00075".

If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

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THIN STRIP

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WATERBURY, CONN.

TRADE ASSOCIATIONS AND TECHNICAL SOCIETIES

A list of some 200 Professional and Technical Societies and Trade Associations in Metalworking and Metal Production.

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Aircraft Industries Assn. of America
610 Shoreham Bldg., Washington 5, D. C.
Pres.: Admiral DeWitt C. Ramsey, USN (Ret.)

Alloy Casting Institute
32 hird Ave., Mineola, N. Y.
Exec. Vice-Pres.: E. A. Schoefer

Aluminum Assn.
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Sec.-Treas.: Donald M. White

Aluminum Smelters Research Institute
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Sec.: Carl H. Burton

Aluminum Wares Assn.
1506 First National Bank Bldg., Pittsburgh 22, Pa.
Sec.: Stuart J. Swenson

Aluminum Window Manufacturers Assn.
74 Trinity Place, New York 6, N. Y.
Sec. & Counsel: Herbert S. Blake, Jr.

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Mgr.: Henry E. Aldrich

American Boiler Mfrs. Assn. and Affiliated Industries
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Sec.: A. C. Baker

American Bureau of Metal Statistics
50 Broadway, New York, N. Y.
Director: R. R. Eckert

American Coke & Chemicals Institute
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President: Samuel Weiss

American Die Casting Institute
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Sec.: W. J. Parker

American Electroplaters' Society
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Exc. Secy.: P. Peter Kovatis

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Secy.-Treas.: W. W. Maloney

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American Hardware Manufacturers Assn.
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Secy.: A. Faubel

American Home Laundry Manufacturers' Assn.
342 Madison Ave., New York 17, N. Y.
Secy.: Arthur L. Faubel

American Home Laundry Manufacturers' Assn.
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Exec. Secy.: John J. Reinecke

American Hot Dip Galvanizers Assn., Inc.
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Secys.: Edward H. Robie, Ernest Kirkendall

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KRANE KAR
"DOES JOB FASTER, SAVES US ONE MAN,"
says Jim Gull, Supt. Equip't., Gull Contracting Co., New Lincoln Tunnel Job, New York
Another SILENT HOIST "First" —FLUID DRIVE!

"We had a 20-ton crane on the job; now the KRANE KAR* does it faster and saves us one man. Works all over site as utility crane, 8 hrs. a day, 5 or 6 days a week. Handles beams, buckets, concrete and steel forms, lumber, cement, etc. Stores incoming materials and delivers them where needed. Loads, unloads trucks, and carries big loads up and down ramp. KRANE KAR is easy to operate; we have a half dozen men here who can run it. Doing a fine job for us," says Mr. Gull.

Write for illustrated Bulletin No. 79

KRANE KAR Swing-Boom Mobile Crane *available gas or diesel; adjustable telescopic boom; rubber tired; 5 sizes: 1½, 2½, 5, 10, 12½ ton cap.*

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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Creative engineering ability

. . . is a part of every WSM transaction—particularly when there's a stamping problem of unusual design, the working of a new material or the challenge of a unique fabricating procedure. Instead of wasting time . . . let WSM engineers quickly help you get low-cost, fast and accurate stampings.

Here, you'll find complete equipment, ready to produce light, medium, heavy and deep drawn stampings in all shapes and sizes . . . with deliveries to meet your requirements.

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Stainless Steel?

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MicroRold® 430 Sheet

MicroRold Type 430 is a straight chromium-stainless with a nominal composition of 17% chromium. Though it is less resistant to corrosion, it retains all of the other desirable qualities of stainless and has proven very satisfactory in a wide range of mild corrosion applications.

MicroRold 430 is the least expensive of all stainless types because it does not contain nickel. This results in a 7¾c per pound difference in base price between Type 430 and Type 302, the most popular higher grade stainless. A saving of $155 per ton is possible and is of merit to cost-conscious fabricators.

MicroRold Type 430 sheets are available in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for your copy, "Care and Use of 430 Stainless".

Washington Steel *Corporation*

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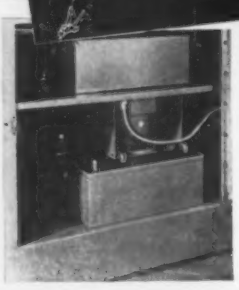
Ruthman Gusher Coolant Pumps Are Adaptable



Illustrated is a Gusher Coolant Pump mounted on Beco Model #410 Automatic Drilling and Tapping Machine.

Photo Courtesy Batchelder Eng. Co., Inc.

Gusher Coolant Pumps readily lend themselves to novel and unusual applications. On the Beco Model #410 automatic drilling and tapping machine, the Gusher Coolant Pump is mounted on roller drawer slides for quick and easy exchange of coolants. On all coolant pump problems you can depend on Gusher Coolant Pumps.

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American Society for Testing Materials
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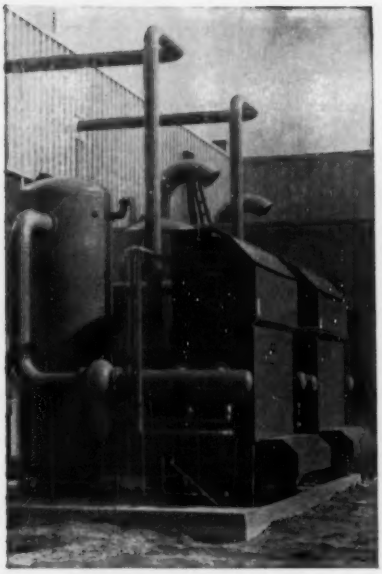
"Well, you wanted fast delivery. That'll be $150, f.o.b. mill.



This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR
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THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient.

Drier air gives you better operation and lower costs in using all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air through a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility systems.

Write for Bulletin No. 130

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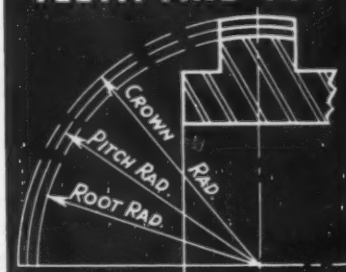

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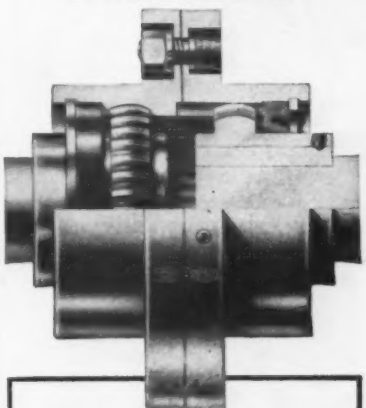

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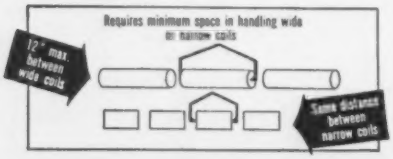

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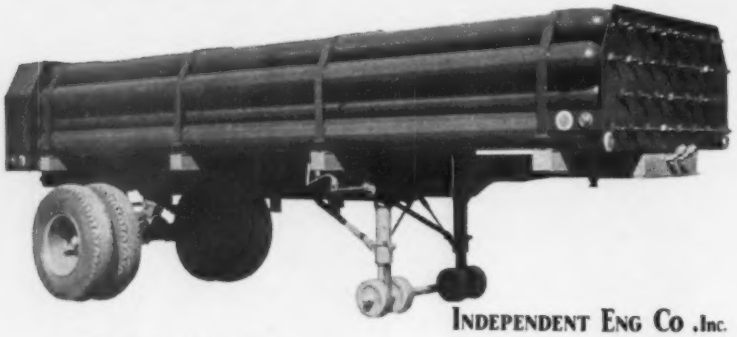

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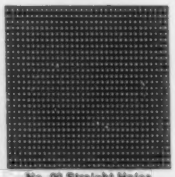

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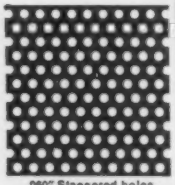

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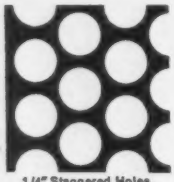

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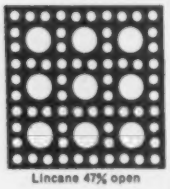

Lincane 47% open

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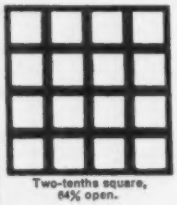

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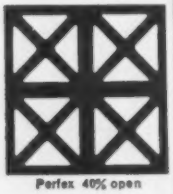
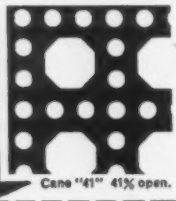


Perfex 40% open

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



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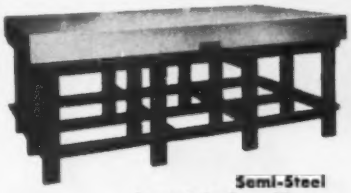

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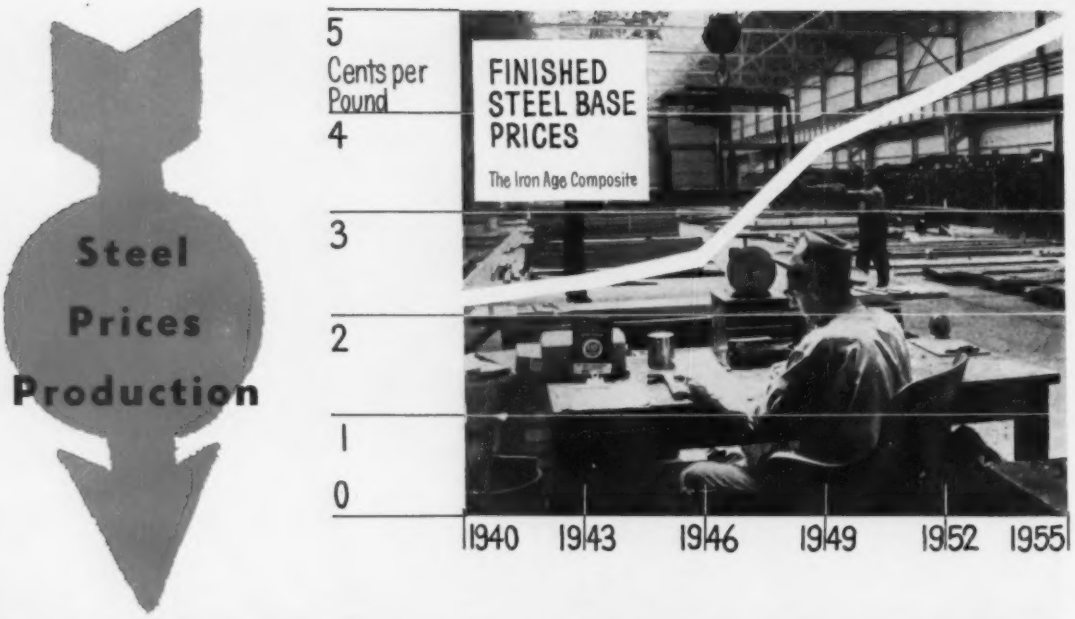


THE IRON AGE FINISHED STEEL COMPOSITE PRICE

Current Series, 1931 to 1955, Cents Per Pound

	1932	1933	1934	1935	1936	1937	1938	1939	1940*	1945*
Jan.	1.852	1.830	1.958	2.065	2.076	2.323	2.584	2.354	2.305	2.412
Feb.	1.543	1.812	1.958	2.065	2.065	2.323	2.581	2.354	2.305	2.427
Mar.	1.852	1.808	1.958	2.065	2.065	2.532	2.578	2.354	2.305	2.432
Apr.	1.892	1.788	2.007	2.065	2.062	2.584	2.578	2.354	2.267	2.433
May	1.891	1.770	2.154	2.065	2.062	2.584	2.569	2.308	2.305	2.436
June	1.888	1.766	2.154	2.065	2.067	2.584	2.513	2.283	2.305	2.464
July	1.892	1.841	2.107	2.065	2.139	2.584	2.359	2.283	2.305	2.464
Aug.	1.889	1.851	2.065	2.065	2.139	2.584	2.359	2.283	2.305	2.464
Sept.	1.883	1.879	2.065	2.065	1.146	2.584	2.357	2.283	2.305	2.464
Oct.	1.873	1.955	2.065	2.076	2.172	2.584	2.320	2.283	2.305	2.464
Nov.	1.866	1.947	2.065	2.076	2.172	2.584	2.354	2.268	2.305	2.464
Dec.	1.861	1.958	2.065	2.076	2.283	2.584	2.354	2.305	2.305	2.464
Average	1.873	1.851	2.051	2.068	2.118	2.536	2.489	2.311	2.302	2.449

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	2.464	2.877	3.193	3.720	3.837	4.131	4.131	4.376	4.634	4.797
Feb.	2.555	2.884	3.215	3.719	3.837	4.131	4.131	4.376	4.634	4.797
Mar.	2.719	2.884	3.241	3.715	3.837	4.131	4.131	4.376	4.634	4.797
Apr.	2.719	2.884	3.241	3.709	3.837	4.131	4.131	4.376	4.634	4.797
May	2.719	2.884	3.214	3.706	3.837	4.131	4.131	4.393	4.634	4.797
June	2.719	2.884	3.211	3.705	3.837	4.131	4.131	4.517	4.634	4.797
July	2.719	2.914	3.293	3.705	3.837	4.131	4.180	4.634	4.799	5.081
Aug.	2.719	3.183	3.720	3.705	3.837	4.131	4.376	4.634	4.801	5.174
Sept.	2.719	3.183	3.720	3.705	3.837	4.131	4.376	4.634	4.801	5.174
Oct.	2.719	3.193	3.720	3.705	3.837	4.131	4.376	4.634	4.798	5.174
Nov.	2.719	3.183	3.720	3.705	3.837	4.131	4.376	4.633	4.797	5.174
Dec.	2.747	3.193	3.720	3.756	4.131	4.131	4.376	4.633	4.797	5.174
Average	2.686	3.014	3.434	3.713	3.862	4.131	4.237	4.518	4.716	4.977

* 1941-1944 inclusive: 2.396.

THE IRON AGE finished steel composite price is a weighted average of the base prices of 10 major steel products which account for the majority of finished steel shipments. It is weighted by the percentage that each of these products is to total finished steel shipments during the base period. With the base constant, the only changes in the composite from 1929 through 1940 or from 1941 through 1949 occur when one or more steel products prices were changed.

In the composite shown here there are two base periods. For the years 1931 through 1940 the base is finished steel shipments for 1929-1939 inclusive. For 1941 through 1950 the base is finished steel shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. Two base periods are used because of basic changes in the shipment pattern in the 20 years covered. In each case the products remain the same. They are hot-rolled bars, structural shapes, plates, rails, pipe, wire and hot- and cold-rolled sheets and strip. To eliminate variations due to nonferrous metals price fluctuations, no coated products are included.

Details of latest revisions which appear in current series may be found in The Iron Age, May 12, 1949, p. 139. This reference also gives a comparison of current series with former series.

STEEL INDUSTRY OPERATING RATES

U. S. Openhearth, Bessemer and Electric Furnace Ingots and Steel for Castings—Percent of Capacity

	1937	1938	1939	1940	1941	1942
Jan.	81.32	29.14	52.69	83.40	96.90	94.50
Feb.	84.26	31.59	54.93	70.00	96.60	95.90
Mar.	89.93	33.67	56.52	63.50	99.70	96.20
Apr.	90.24	33.70	50.97	61.20	97.60	97.70
May	88.79	30.26	48.51	71.80	98.70	98.10
June	74.47	23.33	53.57	84.50	98.20	96.30
July	78.37	33.25	52.60	83.00	93.40	94.50
Aug.	83.71	42.63	62.45	89.50	95.70	95.40
Sept.	76.19	46.03	72.68	90.60	96.40	96.40
Oct.	53.23	52.19	88.52	96.10	99.00	100.00
Nov.	38.18	61.74	93.46	96.60	98.30	97.80
Dec.	25.34	52.72	85.91	94.10	98.10	96.60
Average	72.33	39.60	64.53	82.10	97.40	96.80

	1943	1944	1945	1946	1947	1948
Jan.	96.80	95.70	88.80	42.60	93.20	93.60
Feb.	98.50	97.00	90.80	19.80	91.90	93.00
Mar.	100.00	98.60	95.00	83.30	94.40	95.30
Apr.	99.30	98.80	92.80	77.50	93.90	80.40
May	98.40	97.10	91.80	52.20	94.70	94.80
June	94.80	94.10	87.10	74.40	92.90	93.90
July	96.20	94.30	86.30	84.90	85.10	88.70
Aug.	96.30	94.10	70.70	86.90	92.20	93.10
Sept.	100.70	94.00	78.30	86.90	90.80	96.10
Oct.	101.20	95.60	69.00	89.00	97.70	99.90
Nov.	98.60	94.30	78.90	85.40	96.50	100.50
Dec.	94.20	92.60	74.80	73.90	95.40	97.70
Average	98.10	95.50	83.50	72.50	93.00	94.10

	1949	1950	1951	1952	1953	1954	1955
Jan.	100.4	94.0	99.9	99.3	99.1	75.3	82.7
Feb.	101.6	89.2	97.2	100.7	99.1	74.3	88.0
Mar.	102.9	88.8	102.5	102.2	101.8	69.0	93.4
Apr.	98.6	100.6	103.1	89.7	98.7	68.1	94.8
May	93.0	101.4	102.8	89.2	100.1	70.7	96.6
June	82.2	99.6	101.0	18.4	97.2	72.0	94.1
July	71.0	94.8	98.3	17.7	93.1	62.9	85.3
Aug.	82.3	96.5	98.7	92.4	94.2	63.1	89.7
Sept.	83.6	99.4	101.2	101.9	92.1	66.7	95.7
Oct.	11.4	102.4	103.0	106.6	94.7	72.9	98.2
Nov.	53.4	97.0	102.6	105.9	89.9	79.1	99.0
Dec.	94.8	98.0	100.6	105.6	79.7	78.6	93.2†
Average	81.1	96.9	100.9	85.8	94.9	71.0	92.8†

† Preliminary.

Source: American Iron and Steel Institute.

Steel Industry

Openhearth, bessemer and electric furnace steel capacity, production and operating rates. . . . Canadian output, capacity.

COMPOSITE PRICE BY PERIODS

Period	Cents per Pound
May 29, 1945 to Feb. 18, 1946	2.464
Feb. 19, 1946 to Dec. 9, 1946	2.719
Dec. 10, 1946 to Dec. 16, 1946	2.734
Dec. 17, 1946 to Dec. 30, 1946	2.765
Dec. 31, 1946 to Jan. 6, 1947	2.848
Jan. 7, 1947 to July 28, 1947	2.884
July 29, 1947 to Feb. 16, 1948	3.193
Feb. 17, 1948 to May 3, 1948	3.241
May 4, 1948 to July 26, 1948	3.211
July 27, 1948 to Aug. 2, 1948	3.721
Aug. 3, 1948 to Feb. 14, 1949	3.720
Feb. 15, 1949 to Mar. 14, 1949	3.717
Mar. 15, 1949 to Mar. 28, 1949	3.714
Mar. 29, 1949 to Apr. 11, 1949	3.711
Apr. 12, 1949 to May 2, 1949	3.708
May 3, 1949 to Dec. 21, 1949	3.705
Dec. 22, 1949 to Dec. 28, 1949	3.836
Dec. 29, 1949 to Dec. 4, 1950	3.837
Dec. 5, 1950 to July 23, 1952	4.131
July 24, 1952 to May 8, 1953	4.376
May 9, 1953 to May 21, 1953	4.390
May 22, 1953 to June 16, 1953	4.417
June 17, 1953 to Nov. 14, 1953	4.634
Nov. 15, 1953 to Dec. 15, 1953	4.632
Dec. 16, 1953 to June 30, 1954	4.634
July 1, 1954 to July 2, 1954	4.635
July 3, 1954 to July 5, 1954	4.791
July 6, 1954 to Oct. 3, 1954	4.801
Oct. 4, 1954 to Nov. 9, 1954	4.798
Nov. 10, 1954 to July 11, 1955	4.797
July 12 to July 18, 1955	5.178
July 19 to July 25, 1955	5.176
July 26, 1955	5.174

CANADIAN STEEL OUTPUT

Ingots and Steel for Castings, Net Tons

	Ingots	Castings	Total Steel Ingots and Castings
1929	1,466,688	78,562	1,545,250
1930	1,072,321	60,830	1,133,151
1931	744,605	41,501	786,106
1932	349,843	25,664	375,507
1933	441,346	17,830	459,176
1934	827,041	23,116	850,157
1935	1,016,814	35,123	1,051,937
1936	1,211,334	38,337	1,249,671
1937	1,496,575	74,652	1,571,137
1938	1,238,078	56,636	1,294,714
1939	1,266,056	60,997	1,327,053
1940	2,177,973	77,899	2,255,872
1941	2,578,063	123,250	2,701,313
1942	2,942,921	178,440	3,121,361
1943	2,848,235	148,743	2,996,978
1944	2,878,407	146,003	3,024,410
1945	2,747,206	134,117	2,881,323
1946	2,253,437	81,194	2,334,631
1947	2,854,532	90,634	2,945,166
1948	3,089,027	112,629	3,201,656
1949	3,089,368	97,562	3,186,930
1950	3,298,068	88,063	3,381,131
1951	3,446,125	121,236	3,567,361
1952	3,578,106	122,037	3,700,143
1953	4,009,813	105,656	4,115,469
1954	3,113,882	80,300	3,194,122
1955*	4,420,265	86,130	4,506,395

* Estimated.

CANADIAN STEEL CAPACITY

Ingot Capacity and Operating Rates

	Steel Ingot Capacity	Steel Ingot Output	Percent of Capacity
1938	2,346,000	1,238,078	52.7
1939	2,346,000	1,266,056	53.9
1940	2,667,000	2,177,973	81.6
1941	2,964,000	2,578,063	86.9
1942	3,172,000	2,942,921	92.7
1943	3,257,500	2,848,235	87.4
1944	3,338,200	2,878,407	86.2
1945	3,358,800	2,767,206	81.7
1946	3,358,800	2,253,437	67.0
1947	3,245,000	2,854,532	87.9
1948	3,490,000	3,089,027	88.5
1949	3,698,000	3,089,368	84.1
1950	3,672,500	3,298,068	89.8
1951	3,630,900	3,446,125	94.9
1952	3,630,900	3,578,106	98.5
1953	4,302,800	4,009,813	93.1
1954	4,657,500	3,113,822	66.8
1955	4,883,000	4,420,265	90.5

* December estimated.

STEEL CAPACITY, PRODUCTION AND RATES

Ingots and Steel for Castings, Net Tons

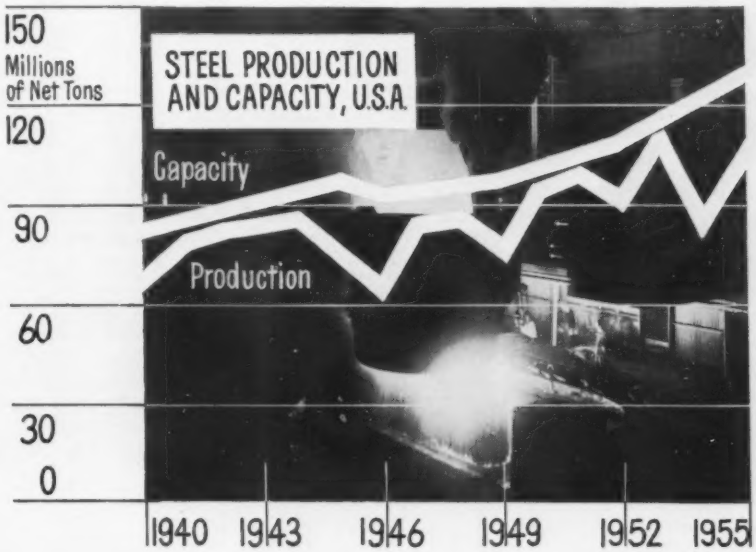
		Openhearth		Bessemer		Electric*		Total	
	Total Capacity	Production	Percent of Total Output	Production	Percent of Total Output	Production	Percent of Total Output	Production	Percent of Capacity
1955†	125,828,310	105,100,000	90.1	3,200,000	2.8	8,200,000	7.1	116,500,000	92.6
1954	124,330,410	80,327,494	91.0	2,548,104	2.9	5,436,054	6.1	88,311,652	71.0
1953	117,547,470	100,473,623	90.0	3,855,705	3.5	7,280,191	6.5	111,609,719	94.9
1952	108,587,670	82,846,439	88.9	3,523,677	3.8	6,797,923	7.3	93,168,039	85.8
1951	104,229,650	93,166,518	88.6	4,890,948	4.6	7,142,384	6.8	105,199,848	100.9
1950	* *	86,262,509	89.1	4,534,558	4.7	6,039,008	6.2	96,836,075	98.9
1949	96,120,930	70,248,803	90.1	3,946,656	5.1	3,782,717	4.8	77,975,176	81.1
1948	94,243,460	79,340,157	89.5	4,243,172	4.8	5,057,141	5.7	88,640,470	94.1
1947	91,241,250	76,673,793	90.5	4,232,543	5.0	3,787,785	4.5	84,894,071	93.0
1946	91,890,560	60,711,963	91.2	3,327,737	5.0	2,563,024	3.8	66,602,724	72.5
1945	95,505,280	71,939,602	90.3	4,305,318	5.4	3,456,728	4.3	79,701,648	83.5
1944	93,854,420	80,383,953	89.7	5,039,923	5.6	4,237,724	4.7	89,641,600	95.5
1943	90,599,190	78,621,804	88.5	5,625,482	6.3	4,589,216	5.2	88,836,512	98.1
1942	88,896,550	78,501,957	88.9	5,553,424	6.5	3,976,550	4.6	88,031,931	96.8
1941	85,158,150	74,389,619	89.8	5,578,071	6.7	2,871,589	3.5	82,839,259	97.3
1940	81,619,496	61,573,083	91.9	3,708,573	5.6	1,701,030	2.5	66,982,686	82.1
1939	81,828,958	48,409,800	91.7	3,358,916	6.4	1,029,998	1.9	52,798,714	64.5
1938	80,158,638	29,080,016	91.6	2,106,340	6.6	565,634	1.8	31,751,990	39.6
1937	78,148,374	51,824,979	91.5	3,863,918	6.8	948,048	1.7	56,636,945	72.5
1936	78,164,300	48,760,463	91.2	3,873,472	7.2	866,064	1.6	53,499,999	68.4
1935	78,451,930	34,401,280	90.1	3,175,235	8.3	607,190	1.6	38,183,705	48.7
1934	79,128,416	26,354,838	90.3	2,421,840	8.3	405,246	1.4	29,181,924	37.4
1933	78,614,403	22,827,473	87.7	2,720,246	10.5	472,510	1.8	26,020,229	33.1
1932	78,780,913	13,335,210	87.0	1,715,925	11.2	270,766	1.8	15,322,901	19.5
1931	77,257,803	25,210,714	86.8	3,386,259	11.6	461,988	1.6	29,058,961	37.6
1930	72,985,406	39,255,073	86.1	5,639,714	12.4	688,634	1.5	45,583,421	62.5
1929	71,438,516	54,155,235	85.7	7,977,210	12.6	1,073,045	1.7	63,205,490	88.5
1928	68,840,912	49,407,631	85.6	7,414,618	12.8	907,232	1.6	57,729,481	83.9
1927	67,236,117	42,636,633	84.7	6,934,734	13.8	756,138	1.5	50,327,407	74.9
1926	67,750,035	45,575,016	84.2	7,766,716	14.4	747,282	1.4	54,089,014	83.5

* Includes very small tonnages of crucible steel

† Preliminary

** Jan. 1, 1950 to June 30, 1950 capacity was 99,392,800 net tons. Beginning July 1, 1950 capacity was revised to 100,563,500 net tons.

Source: American Iron & Steel Institute



Steel Industry

Monthly data on U.S. production of openhearth, bessemer and electric furnace ingots . . . Round-up of world steel output.

WORLD STEEL PRODUCTION

Ingots and Steel for Castings, Thousands of Net Tons

Compiled by THE IRON AGE from the United Nations Bulletin of Statistics, Chambre Syndicate de la Siderurgie Francaise, British Iron and Steel Federation and the American Iron and Steel Institute.

Country	1955*	1954[1]	1953[1]	1952	1951	1950	1949	1948	1947	1946	1945	1944
Australia	2,430	2,117	2,296	1,835	1,606	1,596	1,309	1,425	1,373	1,164	1,505	1,703
Austria	1,940	1,822	1,427	1,165	1,133	1,044	926	713	394	207	189	
Belgium	6,270	5,522	4,997	5,621	5,590	4,155	4,242	4,318	3,181	2,508	895	670
Brazil	1,210	1,288	1,109	985	930	834	677	545	426	379	227	243
Canada	4,150	3,182	4,110	3,703	3,567	3,384	3,186	3,189	2,902	2,293	2,803	2,930
China	2,755	2,397	1,150									
Czechoslovakia	5,525	4,884	4,883	3,944	3,651*	3,190*	2,758*	2,910*	2,520	1,843	1,045	2,778
France	13,670	11,319	11,023	11,979	10,842	9,537	10,088	7,984	6,338	4,859	1,822	3,408
Ger- (Western	23,155	19,221	16,997	17,423	14,888	13,361[2]	10,090[2]	6,127[2]	4,739[2]	3,604[2]	5,500	24,481
many (Eastern	2,755	2,486	2,606	2,067	1,711							
Hungary	1,600	1,644	1,653	1,539	1,360*	1,100*	882*	794*	658	389	142	766
India	1,935	1,882	1,691	1,768	1,680	1,610	1,517	1,237	1,346	1,373	1,426	1,465
Italy	5,885	4,638	3,858	3,897	3,362	2,583	2,265	2,342	1,874	1,269	436	1,138
Japan	9,095	8,523	8,445	7,703	7,167	5,332	3,352	1,916	1,041	608	1,177	7,932
Luxembourg	3,505	3,118	2,931	3,309	3,391	2,702	2,507	2,705	1,888	1,426	291	1,389
Mexico	530	515	504	561	500	390	380	268	353	277	201	199
Netherlands	1,070	1,023	948	755	609							
Poland	5,070	4,370	3,985	3,509	3,078	2,750*	2,539*	2,116*	1,731	1,344	546	755
Rumania	860	693	793	769	720*							
Saar	3,465	3,093	2,959	3,112	2,869	2,092	1,936	1,922	780	317		
South Africa	1,860	1,523	1,266	1,326	1,045	830	699	750	680	568	594	541
Spain	1,435	1,209	985	1,000	902	900	793	694	581	656	617	546
Sweden	2,205	2,052	1,969	1,836	1,658	1,587	1,511	1,270	1,311	1,335	1,327	1,320
United Kingdom	22,120	20,742	19,723	18,388	17,516	18,240	17,256	16,682	12,246	14,220	13,243	13,599
U.S.S.R.	49,625	45,203	41,800	36,029	34,500*	29,800*	23,800*	18,700*	14,700*	13,400*	12,300*	13,300
United States	116,500	88,312	111,610	93,168	105,200	96,838	77,978	88,894	84,894	66,683	79,702	89,642
Yugoslavia	860	679	568	488	470*							
Others	1,700	1,546	2,280	1,524								
Totals	283,000	245,013	258,706	229,423	229,945	204,348	173,386	167,107	147,156	120,345	125,896	171,905

* Estimated. [1] Revised. [2] British, French and United States Zones.

WORLD STEEL DATA

Data in the table at left are based on an extensive Iron Age study. Assisting in the study were the Intelligence Dept. of the British Iron & Steel Federation Chambre Syndicate de la Siderugie Francaise, United Nations, American Iron and Steel Institute and Iron Age correspondents throughout the world. Though based on the best available intelligence, the accuracy of Iron Curtain steel data is naturally not of the same order as that of the free world.

U. S. MONTHLY STEEL INGOT PRODUCTION

Openhearth, Bessemer and Electric Furnace Ingots and Steel for Castings, Net Tons; U. S. Only

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Jan.	4,288,212	2,852,540	1,685,665	1,157,745	2,276,596	3,279,473	3,474,353	5,398,326	1,984,815	3,663,004	5,764,723	6,928,083	7,112,106
Feb.	4,579,761	2,892,154	1,681,421	1,221,664	2,521,472	3,169,909	3,379,587	5,050,824	1,942,795	3,448,120	4,525,797	6,237,900	6,512,535
March	4,828,571	3,468,208	1,627,030	1,022,675	3,190,040	3,273,910	3,810,436	5,970,247	2,293,884	3,929,387	4,389,183	7,131,641	7,392,111
April	4,664,182	3,141,887	1,429,848	1,531,813	3,346,922	3,017,177	4,494,782	5,801,540	2,196,413	3,431,600	4,100,474	6,756,949	7,121,291
May	4,520,520	2,897,385	1,277,302	2,250,236	3,875,202	3,009,425	4,614,529	5,894,260	2,661,169	3,372,636	4,967,782	7,053,238	7,382,578
June	3,879,980	2,416,078	1,036,102	2,919,687	3,487,612	2,560,771	4,543,888	4,787,710	1,868,848	3,806,729	5,657,443	6,800,730	7,018,302
July	3,316,654	2,143,351	915,738	3,607,288	1,697,879	2,591,240	4,473,940	5,212,832	2,259,677	3,648,639	5,724,625	6,821,682	7,144,958
Aug.	3,473,898	1,949,462	961,153	3,260,279	1,574,649	3,331,770	4,782,442	5,580,683	2,903,805	4,341,726	6,186,383	7,000,957	7,227,855
Sept.	3,223,766	1,754,817	1,125,892	2,599,370	1,446,551	3,227,876	4,744,841	4,907,592	3,029,736	4,881,601	6,056,246	6,819,708	7,057,519
Oct.	3,055,972	1,805,653	1,233,957	2,373,729	1,689,272	3,590,945	5,182,430	3,881,819	3,554,912	6,223,126	6,644,542	7,242,683	7,579,514
Nov.	2,510,820	1,807,315	1,171,710	1,731,930	1,836,068	3,599,687	4,941,014	2,464,793	4,072,676	6,292,322	6,469,107	6,969,987	7,179,812
Dec.	2,246,742	1,477,529	977,389	2,047,780	2,239,126	3,611,702	5,056,843	1,685,273	3,751,253	5,958,893	6,495,357	7,163,999	7,304,540
Total	44,589,058	28,606,379	5,123,207	25,724,196	29,181,329	38,183,705	53,449,085	56,635,899	31,751,983	52,797,783	66,981,662	82,927,557	86,029,921

	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	7,424,522	7,592,603	7,204,312	3,872,887	7,222,612	7,480,878	8,197,390	7,941,787	8,848,466	9,136,117	9,897,962	7,951,486	8,837,736
Feb.	6,824,604	7,194,009	6,652,765	1,392,682	6,430,401	6,948,017	7,493,942	6,803,032	7,770,407	8,657,210	8,932,779	7,083,237	8,496,934
March	7,674,578	7,826,257	7,705,929	6,508,784	7,318,974	7,616,770	8,401,796	7,497,822	7,076,630	9,404,191	10,168,096	7,289,600	9,981,754
April	7,373,703	7,593,688	2,289,887	5,801,195	7,051,842	6,224,487	7,796,165	8,224,504	8,845,979	7,991,142	9,545,538	6,970,937	9,815,095
May	7,549,691	7,702,576	7,448,667	4,072,620	7,339,014	7,580,642	7,598,990	8,564,207	9,100,155	8,204,596	9,997,080	7,472,738	10,328,316
June	7,039,353	7,234,257	6,840,522	5,625,773	6,977,714	7,265,249	6,504,658	8,143,230	8,662,348	1,639,491	9,404,479	7,363,634	9,746,467
July	7,407,876	7,948,387	6,985,571	6,618,683	6,578,685	7,075,517	5,784,831	8,082,922	8,684,485	1,626,958	9,275,673	6,827,587	9,100,948
Aug.	7,586,464	7,498,913	5,735,317	6,924,572	6,991,152	7,446,834	6,722,771	8,242,174	8,739,096	8,498,687	9,405,580	6,666,907	9,584,545
Sept.	7,514,339	7,235,111	5,962,475	6,585,566	6,797,457	7,424,844	6,597,935	8,204,997	8,660,357	9,062,185	8,883,429	6,807,483	9,882,325
Oct.	7,614,117	7,620,885	5,586,776	6,951,742	7,570,152	7,996,695	928,347	8,752,686	9,121,886	8,806,830	9,462,722	7,701,563	10,501,050
Nov.	7,371,975	7,278,719	6,200,466	6,457,771	7,242,427	7,797,556	4,223,129	8,023,393	8,799,352	9,438,886	8,690,052	8,089,427	10,249,000
Dec.	7,258,144	7,336,170	6,057,937	5,760,501	7,375,641	7,780,779	7,728,224	8,355,311	8,690,678	9,690,162	7,946,328	8,287,073	9,965,000
Total	88,636,366	89,641,575	79,701,624	68,602,706	84,894,071	88,640,470	77,978,176	96,836,075	105,199,846	93,156,375	111,609,719	88,311,652	116,500,000

* Estimate.

Source: American Iron and Steel Institute.

Steel Industry

Financial analysis of steel industry . . . Twenty-nine steel producers covered represent 93 pct of U.S. ingot capacity.

FINANCIAL ANALYSIS OF THE STEEL INDUSTRY

For years 1950 through 1954. Data Cover 29 Companies Representing 93 Pct of U. S. Ingot Capacity

COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes	Net Income	Net Income Percent of Sales	Earnings Per Common Share	Invested Capital
U. S. Steel Corp.	1954	38,715,000	28,355,000	73.2	20,239,000	$3,250,369,279	$190,000,000	$195,417,611	6.0	$6.46	$2,672,832,918
	1953	36,399,000	35,827,000	98.4	25,091,000	3,861,034,728	323,000,000	222,087,840	5.8	7.54	2,319,132,239
	1952	34,642,000	29,436,000	85.0	21,133,000	3,137,397,336	117,000,000	143,687,746	4.6	4.54	2,197,124,774
	1951	34,643,000	34,323,000	101.3	24,626,000	3,524,121,226	398,000,000	184,359,787	5.2	6.10	2,150,858,480
	1950	33,900,000	31,457,000	98.2	22,635,000	2,956,408,146	234,000,000	215,464,142	7.3	7.29	2,076,950,448
Bethlehem Steel Corp.	1954	18,500,000	13,810,076	74.6	10,226,752	1,667,377,179	119,000,000	132,837,154	8.0	13.18	1,232,094,615
	1953	17,600,000	17,662,687	100.4	12,712,994	2,094,952,155	161,000,000	133,947,837	6.4	13.30	1,163,636,586
	1952	16,800,000	14,116,342	84.0	10,290,587	1,701,541,383	66,000,000	90,900,771	5.3	8.80	1,217,957,726
	1951	16,000,000	16,405,677	102.5	12,138,732	1,799,506,346	162,000,000	106,531,293	5.9	10.43	1,093,925,932
	1950	15,000,000	15,116,456	100.8	10,933,296	1,445,404,331	122,000,000	122,976,071	8.5	12.15	977,709,177
Republic Steel Corp.	1954	10,262,000	6,972,812	69.8	5,012,330	846,310,670	49,900,000	52,875,164	6.2	7.10	629,318,251
	1953	10,262,000	9,630,454	94.5	7,135,745	1,137,123,547	100,500,000	56,743,547	5.0	9.25	620,873,235
	1952	10,262,000	7,991,238	82.8	6,025,990	918,447,135	42,600,000	44,274,053	4.8	7.21	606,379,373
	1951	9,490,000	9,142,096	102.0	6,993,619	1,052,715,386	117,500,000	54,921,541	5.2	9.03	562,829,895
	1950	8,987,000	8,551,013	95.3	6,388,157	881,753,328	79,200,000	63,794,711	7.2	10.53	439,440,217
Jones & Laughlin Steel Corp.	1954	6,186,500	4,570,000	74.0	3,203,000	492,941,000	22,543,000	25,032,000	5.1	3.80	497,439,000
	1953	6,186,500	6,033,000	96.0	4,278,000	624,387,000	27,900,000	31,015,000	5.0	4.77	492,373,000
	1952	5,900,000	4,710,000	83.0	3,332,000	495,401,000	*5,858,000*	19,482,000	3.9	2.91	499,596,000
	1951	4,847,000	5,032,000	104.0	4,000,000	564,330,000	54,339,000	30,998,000	5.5	4.76	463,219,000
	1950	4,847,000	4,944,000	102.0	3,844,000	487,451,000	33,850,000	39,744,000	8.2	14.72	377,236,000
National Steel Corp.	1954	6,000,000				494,058,380	27,750,000	30,334,871	6.3	4.12	427,082,106
	1953	5,650,000				634,178,060	69,325,000	50,334,130	7.9	6.84	418,230,307
	1952	5,109,000				548,625,817	42,000,000	37,569,477	6.9	5.10	385,035,319
	1951	4,750,000				619,461,408	95,000,000	45,287,093	7.32	6.15	354,558,375
	1950	4,500,000				537,024,673	61,100,000	57,814,974	10.77	7.85	331,066,107
Youngstown Sheet & Tube Co.	1954	5,520,000	3,868,525	70.1	2,606,540	433,406,272	12,104,000	20,182,500	4.7	6.02	43,764,332
	1953	4,947,500	5,091,876	102.9	3,675,229	584,059,068	27,900,000	30,839,716	5.6	9.21	424,993,129
	1952	4,370,000	3,937,490	90.1	2,867,500	439,623,183	16,890,000	22,915,822	5.3	6.84	399,815,973
	1951	4,370,000	4,451,854	104.7	3,362,104	489,305,162	38,692,000	30,644,201	6.34	9.15	345,850,199
	1950	4,250,000	4,124,781	101.0	3,031,676	409,898,010	33,820,000	40,616,403	10.05	12.12	301,756,047
Armco Steel Corp.	1954	4,902,000	4,448,772	90.8	3,171,401	532,045,314	42,522,317	41,100,266	7.7	7.86	403,749,452
	1953	4,718,000	4,704,773	99.7	3,375,630	588,919,900	50,788,608	33,902,462	5.8	6.50	388,931,246
	1952	4,525,000	4,042,473	89.3	3,078,639	518,575,218	43,095,226	31,337,861	6.0	6.61	375,908,210
	1951	4,525,000	4,357,562	96.3	3,386,554	534,834,687	69,141,292	35,004,487	6.54	6.69	338,788,098
	1950	4,330,000	3,958,727	91.4	2,976,293	439,296,931	48,173,228	47,000,506	10.70	11.76	288,944,394
Inland Steel Co.	1954	4,700,000	4,522,257	96.2	3,392,659	537,024,479	37,930,000	41,287,152	7.7	7.92	287,259,955
	1953	4,500,000	4,513,076	100.3	3,712,000	579,509,058	39,379,000	33,867,184	5.9	6.90	344,188,324
	1952	3,750,000	3,307,253	84.7	3,307,253	460,451,935	13,117,000	23,755,218	5.2	4.85	337,831,507
	1951	3,750,000	3,837,268	102.3	3,596,888	521,449,655	53,520,000	34,398,585	6.6	7.02	290,682,261
	1950	3,750,000	3,675,707	102.8	3,406,564	461,376,600	41,224,700	38,015,676	8.2	7.76	275,631,279
Colorado Fuel & Iron Corp.	1954	2,489,035	1,845,693	74.8	1,687,950	250,235,696	6,125,000	7,051,729	2.8	2.46	167,132,675
	1953	2,311,785	2,130,451	92.2	1,948,414	248,835,574	14,572,400	8,031,224	3.2	3.09	166,459,029
	1952	2,024,000	1,892,485	93.5	1,575,987	195,757,164	8,461,500	5,761,965	2.9	2.64	133,736,055
	1951	1,522,664	1,615,246	106.1	1,708,855	191,444,412	18,936,500	10,382,228	5.42	5.06	96,682,268
	1950	1,472,000	1,196,531	81.4	1,115,504	112,642,939	2,704,300	4,406,226	3.91	3.30	82,383,166
Wheeling Steel Corp.	1954	2,130,000	1,589,643	74.6		190,224,955	8,483,080	9,595,740	5.0	5.48	205,866,412
	1953	1,880,000	1,797,419	96.6		219,509,774	14,036,000	12,458,311	5.7	7.49	205,968,477
	1952	1,880,000	1,464,985	78.8		180,285,277	7,475,000	10,950,780	6.1	6.43	201,707,487
	1951	1,880,000	1,874,236	100.8		229,012,621	33,662,000	17,392,959	7.59	10.96	192,703,514
	1950	1,800,000	1,636,475	94.7		186,723,442	17,342,000	18,314,517	9.81	11.58	169,623,166
Sharon Steel Corp.	1954	1,550,000	846,515	54.6	611,668	99,347,910	1,865,000	3,134,864	3.2	2.85	68,711,329
	1953	1,550,000	1,527,706	98.6	1,144,488	168,268,508	7,240,000	6,709,625	4.0	6.10	69,306,485
	1952	1,550,000	1,264,170	82.8	944,893	132,376,426	2,750,000	5,120,414	3.9	4.65	68,016,840
	1951	1,550,000	1,600,205	103.2	1,128,433	169,961,946	8,480,000	8,861,187	5.2	8.06	68,296,426
	1950	1,441,400	1,448,978	100.5	1,047,795	136,120,789	9,620,000	9,284,643	6.8	10.03	55,646,963
Kaiser Steel Corp.	1954	1,536,000	1,382,877	90.0	933,843	128,491,032	3,325,000	7,926,666	6.2	1.75	245,984,849
	1953	1,536,000	1,458,904	100.1	951,897	134,500,041	9,700,000	9,121,284	6.8	2.12	240,847,814
	1952	1,380,000	1,381,862	100.1	941,108	117,925,049	9,900,000	10,399,306	8.8	2.52	208,125,843
	1951	1,380,000	1,217,196	101.4	389,420	100,471,475	6,690,017	7,510,561	7.5	1.86	172,834,377
	1950	1,200,000	1,101,961	104.6	770,802	84,480,816	8,100,000	11,940,593	14.1		136,767,059
Pittsburgh Steel Co.	1954	1,320,000	1,070,386	76.2	784,420	124,489,418	973,000	2,170,694	1.8	.62	116,385,912
	1953	1,404,000	1,037,335	86.4	1,009,511	141,471,302	5,310,000	4,648,195	3.3	2.61	114,525,878
	1952	1,152,000	971,029	85.3	958,829	130,158,219	4,437,000	5,150,034	4.0	3.25	104,203,194
	1951	1,072,000	1,091,364	100.8	1,140,539	150,462,914	16,071,000	7,331,589	4.87	5.99	81,193,695
	1950	1,072,000	1,074,340	100.2	1,001,297	119,185,237	6,510,000	6,350,410	5.33	6.13	59,054,104
Crucible Steel Co. of America	1954	1,351,400				160,621,738	4,398,000	3,705,952	2.3	2.83	119,995,023
	1953	1,351,400				232,276,349	6,896,979	5,109,802	2.2	5.28	122,320,246
	1952	1,350,700				180,266,483	5,577,506	5,394,520	3.0	6.13	124,250,177
	1951	1,198,960				202,868,727	18,099,421	8,363,225	4.1	11.89	105,675,766
	1950	1,153,455				147,807,941	8,200,523	6,311,254	4.27	9.73	95,639,334
Barium Steel Corp.	1954	893,000	237,000	26.5		53,494,604	1,772,500	441,212	0.8	.14	22,222,682
	1953	893,000	497,790	55.7		89,719,175	3,849,840	2,321,140	2.6	1.01	21,097,017
	1952	893,000	690,128	77.3		99,052,028	6,566,295	2,746,050	2.8	1.22	19,588,715
	1951	893,000	627,220	70.23		91,642,638	8,665,674	4,164,177	4.5	1.87	18,345,993
	1950	893,000	471,096	54.0		53,523,876	1,752,942	1,474,226	2.8	.66	15,034,143

Steel Industry

Financial analysis of steel industry showing capacity, sales earnings data, shipments, production, etc., by company.

FINANCIAL ANALYSIS (Continued)

COMPANY	Year	Ingot Capacity Net Tons	Ingot Production Net Tons	Percent of Capacity Operated	Steel Shipments Net Tons	Net Sales and Operating Revenue	Provision for Federal Income Taxes	Net Income	Net Income Percent of Sales	Earnings Per Common Share	Invested Capital
Allegheny Ludlum Steel Corp.	1954	864,200	431,068	49.9	305,208	170,056,405	4,459,000	4,246,083	2.5	2.30	80,073,450
	1953	864,200	680,619	78.8	537,341	242,091,546	11,670,000	7,791,287	3.2	4.40	79,561,980
	1952	889,200	569,921	64.1	467,838	190,091,165	2,900,000	5,940,324	3.1	3.37	75,439,053
	1951	817,200	817,058	100.0	676,960	229,090,224	20,190,000	8,834,140	3.86	5.40	73,240,773
	1950	832,360	701,569	85.5	617,710	177,961,693	10,250,000	9,814,891	5.52	7.07	60,701,579
Northwestern Steel & Wire Co.	1954	825,000	308,780	37.4	246,170	35,628,171	1,065,000	1,018,754	2.9	1.25	17,127,634
	1953	825,000	361,550	43.8	336,056	44,291,906	485,000	303,163	.7	.37	15,838,880
	1952	573,000	313,856	83.9	276,023	34,028,721	645,000	1,830,601	5.4	2.24	15,535,717
	1951	321,000	338,690	105.5	279,662	42,981,692	3,586,700	2,915,271	6.8	3.56	12,350,837
	1950	321,000	282,974	88.2	237,790	31,670,330	1,590,000	2,416,222	7.6	2.95	9,177,398
Granite City Steel Co.	1954	1,050,000	634,909	58.8	559,112	69,265,197	4,400,700	4,012,192	5.8	2.04	90,232,973
	1953	726,000	937,801	130.3	805,455	87,856,006	6,953,500	6,488,452	7.4	3.77	90,878,115
	1952	720,000	621,574	86.3	698,767	74,587,639	3,917,000	4,985,954	6.7	3.17	82,648,433
	1951	726,000	746,911	103.7	821,198	86,773,193	7,980,000	5,142,520	5.9	4.02	57,256,370
	1950	620,000	681,510	109.9	555,858	60,234,883	5,420,000	5,727,406	9.6	11.52	32,137,772
Newport Steel Corp.	1954	706,537	154,658	29.0	119,238	18,371,670	255,000	62,012	0.3	.06	21,976,248
	1953	706,537	528,024	75.0	388,798	63,989,993	2,400,000	2,221,955	3.5	2.06	21,583,738
	1952	706,537	399,666	56.0	304,800	50,502,854	1,500,000	1,903,209	3.8	1.76	21,316,857
Lukens Steel Co.	1954	675,000	631,834	93.6	455,153	74,954,710	2,065,000	2,014,791	2.7	6.33	33,389,833
	1953	675,000	763,879	113.2	590,635	97,850,937	9,325,000	3,607,713	3.7	11.35	30,675,958
	1952	675,000	555,102	82.2	403,771	69,616,358	3,631,165	2,316,791	3.3	7.29	29,637,411
	1951	675,000	686,083	101.6	541,376	80,546,418	8,805,500	3,549,567	4.4	11.16	25,130,524
	1950	675,000	621,761	92.1	439,067	52,935,881	1,505,834	1,922,037	3.63	6.04	23,770,861
Detroit Steel Corp.	1954	660,000	442,753	67.1	371,081	51,688,448	71,338	1,182,528	2.3	.49	40,265,485
	1953	660,000	529,044	80.2	583,421	93,391,509	6,612,624	5,230,250	5.6	2.16	39,082,957
	1952	660,000	529,432	80.2	609,437	87,421,483	4,673,235	4,276,666	4.9	1.80	35,631,387
	1951	660,000	644,788	97.7	780,940	113,747,043	21,812,229	10,514,896	9.2	8.87	33,726,306
	1950	660,000	653,983	99.1	805,689	92,949,234	8,615,770	8,943,140	9.6	7.54	25,582,996
Alan Wood Steel Co.	1954	625,000	345,918	55.3	241,288	36,085,476	216,000	1,246,251	3.4	1.42	36,647,492
	1953	625,000	598,334	95.7	442,537	59,756,645	2,457,000	3,213,690	5.4	4.63	31,561,852
	1952	625,000	658,449	105.4	473,983	60,479,849	2,475,000	2,251,073	3.7	3.17	30,122,666
	1951	625,000	623,232	99.7	465,231	58,764,602	4,192,000	2,303,720	3.9	3.32	29,481,987
	1950	550,000	485,607	88.3	337,415	44,954,826	1,745,000	2,546,902	5.7	3.92	28,668,828
Copperweld Steel Co.	1954	618,380				49,694,295	520,000	927,065	1.9	1.32	29,284,898
	1953	618,318				83,803,418	3,120,000	2,852,076	3.4	5.05	24,223,760
	1952	618,318				71,642,488	2,373,500	2,304,387	3.2	4.38	22,796,213
	1951	554,000				76,185,026	5,510,000	2,703,165	3.5	5.14	18,420,048
	1950	554,400				55,596,047	1,800,000	2,572,539	4.6	4.88	17,032,500
McLouth Steel Corp.	1954	960,000	434,320	56.4	368,667		2,090,000	1,694,890		1.42	132,513,536
	1953	579,700	528,734	91.2			11,560,000	5,241,501		4.41	94,027,396
	1952	579,700	491,726	84.8			9,600,000	4,227,854		4.44	36,035,896
	1951	420,000	449,478	107.0			11,542,000	5,151,039		5.41	32,151,821
Lone Star Steel Co.	1954	550,000	379,009	69.0	184,497	37,208,044		1,008,778	2.7	.38	105,036,365
	1953	550,000	195,155		124,849	27,284,256	338,600	2,113,568	7.8	.80	84,294,641
	1952					18,738,525	768,900	2,432,072	13.0	.93	60,964,968
Laclede Steel Co.	1954	500,000	396,023	79.2	311,140	45,364,073	3,050,000	2,943,150	6.5	14.27	22,106,596
	1953	440,000	427,514	97.2	362,040	50,834,319	4,975,000	2,703,805	5.3	13.11	20,736,280
	1952	410,000	413,292	100.8	355,630	47,545,026	2,764,000	2,132,746	4.5	10.34	17,353,323
	1951	410,000	389,662	95.2	380,230	47,657,001	5,075,000	2,797,998	5.87	13.57	16,926,696
	1950	397,845	360,368	90.7	332,426	39,615,464	3,383,000	3,222,475	8.13	15.62	14,706,971
Keystone Steel & Wire Co.	1954	425,000	334,444	78.7	275,229	49,332,276	6,961,536	6,114,772	12.4	3.26	26,278,271
	1953	425,000	356,969	84.0	268,799	44,554,153	4,861,627	4,149,946	9.3	2.21	23,163,498
	1952	425,000	389,762	91.7	312,068	48,939,590	6,116,648	4,073,232	8.3	2.17	22,013,553
	1951	400,000	323,956	81.0	264,809	44,406,154	6,130,848	4,724,286	10.64	2.52	20,940,321
	1950	325,000	342,489	105.4	295,686	43,206,187	5,609,721	6,477,387	14.99	3.45	19,216,035
Rotary Electric Steel Co.	1954	425,000	172,916	40.7	117,165	31,643,658	1,938,000	1,849,810	5.9	5.31	18,779,711
	1953	425,000	299,776	70.5	240,120	44,150,335	4,924,000	2,262,367	5.1	6.50	18,474,951
	1952	425,000	323,959	76.2	249,259	37,212,183	2,841,000	1,843,064	5.0	6.35	14,390,918
	1951	425,000	372,146	87.6	279,862	40,993,056	5,015,000	2,482,974	6.1	8.55	13,919,093
	1950	425,000	392,764	90.1	307,433	31,103,586	1,910,000	2,160,170	6.9	11.10	10,856,108
Continental Steel Corp.	1954	394,000	336,149	85.3	232,108	35,661,856	1,600,000	1,993,337	5.6	3.97	21,603,024
	1953	394,000	362,048	91.9	252,625	38,761,804	1,700,000	1,603,163	4.4	3.20	20,812,409
	1952	394,000	325,138	82.5	244,169	35,716,970	1,880,000	1,477,030	4.1	2.94	20,111,151
	1951	394,000	363,484	92.3	280,501	39,866,978	4,150,000	1,530,371	3.84	3.05	16,486,435
	1950	393,765	372,138	94.5	282,802	36,428,123	3,220,000	2,660,153	7.30	5.31	15,983,854
GRAND TOTALS	1954	115,324,652	61,900,000	71.0	58,700,000	$9,977,835,497	$853,857,391	$600,383,984	6.0	$5.99	$8,205,155,029
	1953	109,658,940	104,200,000	94.9	74,600,000	12,285,361,086	932,780,178	690,920,244	5.6		7,707,824,207
	1952	103,261,455	88,700,000	85.8	63,200,000	10,062,375,504	426,078,975	501,451,020	4.9		7,363,066,759
	1951	98,273,224	99,998,316	100.9	71,000,000	11,101,430,075	1,213,358,701	638,483,389	5.8		6,685,403,714
	1950	93,547,584	90,000,000	96.7	67,500,000	9,052,563,226	744,872,018	720,900,698	7.9		5,821,985,695

Steel Industry

Steel Prices: Hot and cold rolled sheet and strip, galvanized sheets, tinplate and high-speed tool steel.

COLD-ROLLED STRIP

At Pittsburgh, Cents Per Pound

	1939	1940*	1946*	1947	1948	1949
Jan.	2.95	2.80	2.80	3.20	3.55	4.00
Feb.	2.95	2.80	2.83	3.20	3.55	4.00
Mar.	2.95	2.80	3.05	3.20	3.55	4.00
Apr.	2.95	2.68	3.05	3.20	3.55	4.00
May	2.86	2.80	3.05	3.20	3.53	4.00
June	2.80	2.80	3.05	3.20	3.53	4.00
July	2.80	2.80	3.05	3.27	3.85	4.00
Aug.	2.80	2.80	3.05	3.55	4.00	4.00
Sept.	2.80	2.80	3.05	3.55	4.00	4.00
Oct.	2.80	2.80	3.05	3.55	4.00	4.00
Nov.	2.80	2.80	3.05	3.55	4.00	4.00
Dec.	2.80	2.80	3.17	3.55	4.00	4.06
Average	2.88	2.79	3.03	3.35	3.76	4.01

	1950	1951	1952	1953	1954	1955
Jan.	4.20	4.75	4.85	5.10	5.45	5.75
Feb.	4.21	4.75	4.85	5.10	5.45	5.75
Mar.	4.21	4.75	4.85	5.10	5.45	5.75
Apr.	4.21	4.75	4.85	5.10	5.45	5.75
May	4.21	4.75	4.65	5.10	5.45	5.75
June	4.21	4.75	4.65	5.25	5.45	5.75
July	4.21	4.75	4.74	5.45	5.73	6.12
Aug.	4.21	4.75	5.10	5.45	5.75	6.25
Sept.	4.21	4.75	5.10	5.45	5.75	6.25
Oct.	4.21	4.75	5.10	5.45	5.75	6.25
Nov.	4.21	4.75	5.10	5.45	5.75	6.25
Dec.	4.75	4.75	5.10	5.45	5.75	6.25
Average	4.25	4.75	4.85	5.29	5.60	5.98

* 1941-1945 = 2.88¢.

COLD-ROLLED SHEETS

At Pittsburgh, Cents Per Pound

	1939	1940*	1946*	1947	1948	1949
Jan.	3.20	3.05	3.05	3.20	3.55	4.00
Feb.	3.20	3.05	3.16	3.20	3.55	4.00
Mar.	3.20	3.05	3.275	3.20	3.55	4.00
Apr.	3.20	2.93	3.275	3.20	3.55	4.00
May	3.11	3.05	3.275	3.20	3.49	4.00
June	3.05	3.05	3.275	3.20	3.49	4.00
July	3.05	3.05	3.275	3.27	3.82	4.00
Aug.	3.05	3.05	3.275	3.55	4.00	4.00
Sept.	3.05	3.05	3.275	3.55	4.00	4.00
Oct.	3.05	3.05	3.275	3.55	4.00	4.00
Nov.	3.05	3.05	3.275	3.55	4.00	4.00
Dec.	3.05	3.05	3.215	3.55	4.00	4.04
Average	3.10	3.05	3.242	3.35	3.73	4.00

	1950	1951	1952	1953	1954	1955
Jan.	4.10	4.35	4.35	4.575	4.775	4.95
Feb.	4.10	4.35	4.35	4.575	4.775	4.95
Mar.	4.10	4.35	4.35	4.575	4.775	4.95
Apr.	4.10	4.35	4.35	4.575	4.775	4.95
May	4.10	4.35	4.35	4.575	4.775	4.95
June	4.10	4.35	4.35	4.650	4.775	4.95
July	4.10	4.35	4.395	4.775	4.939	5.231
Aug.	4.10	4.35	4.575	4.775	4.95	5.325
Sept.	4.10	4.35	4.575	4.775	4.95	5.325
Oct.	4.10	4.35	4.575	4.775	4.95	5.325
Nov.	4.10	4.35	4.575	4.775	4.95	5.325
Dec.	4.35	4.35	4.575	4.775	4.95	5.325
Average	4.12	4.35	4.449	4.682	4.882	5.127

* 1941-1945 = 3.05¢.

GALVANIZED SHEETS

At Pittsburgh, Cents Per Pound

	1938	1945†	1946	1947	1948	1949
Jan.	3.80	3.50	3.70	3.55	3.95	4.40
Feb.	3.80	3.50	3.88	3.55	3.95	4.40
Mar.	3.80	3.62	4.05	3.55	3.95	4.40
Apr.	3.80	3.65	4.05	3.55	3.95	4.40
May	3.80	3.66	4.05	3.55	3.91	4.40
June	3.68	3.70	4.05	3.55	3.91	4.40
July	3.50	3.70	4.05	3.63	4.03	4.40
Aug.	3.50	3.70	4.05	3.95	4.40	4.40
Sept.	3.50	3.70	4.05	3.95	4.40	4.40
Oct.	3.45	3.70	4.05	3.95	4.40	4.40
Nov.	3.50	3.70	4.05	3.95	4.40	4.40
Dec.	3.50	3.70	*3.65	3.95	4.40	4.40
Average	3.64	3.65	3.99	3.72	4.13	4.40

	1950	1951	1952	1953	1954	1955
Jan.	4.40	4.80	4.80	5.075	5.275	5.45
Feb.	4.40	4.80	4.80	5.075	5.275	5.45
Mar.	4.40	4.80	4.80	5.075	5.275	5.45
Apr.	4.40	4.80	4.80	5.075	5.275	5.45
May	4.40	4.50	4.80	5.075	5.275	5.45
June	4.40	4.80	4.80	5.160	5.275	5.45
July	4.40	4.80	4.855	5.275	5.439	5.75
Aug.	4.40	4.80	5.075	5.275	5.45	5.85
Sept.	4.40	4.80	5.075	5.275	5.45	5.85
Oct.	4.40	4.80	5.075	5.275	5.45	5.85
Nov.	4.40	4.80	5.075	5.275	5.45	5.85
Dec.	4.80	4.80	5.075	5.275	5.45	5.85
Average	4.43	4.80	4.919	5.182	5.362	5.64

* Based on 10 gage since December 1946; 24 gage base up to that time.
† 1939-1944 = 3.50¢.

HOT-ROLLED SHEETS

At Pittsburgh, Cents Per Pound

	1940*	1945*	1946	1947	1948	1949
Jan.	2.10	2.10	2.20	2.50	2.89	3.28
Feb.	2.10	2.10	2.31	2.50	2.83	3.28
Mar.	2.10	2.18	2.43	2.50	2.83	3.28
Apr.	2.10	2.20	2.43	2.50	2.89	3.26
May	1.93	2.20	2.43	2.50	2.77	3.25
June	2.10	2.20	2.43	2.50	2.77	3.25
July	2.10	2.20	2.43	2.56	2.89	3.25
Aug.	2.10	2.20	2.43	2.80	3.28	3.25
Sept.	2.10	2.23	2.43	2.80	3.28	3.25
Oct.	2.10	2.20	2.43	2.80	3.28	3.25
Nov.	2.10	2.20	2.43	2.80	3.26	3.25
Dec.	2.10	2.20	2.49	2.80	3.28	3.29
Average	2.09	2.18	2.40	2.63	3.00	3.26

	1950	1951	1952	1953	1954	1955
Jan.	3.35	3.60	3.60	3.775	3.925	4.05
Feb.	3.35	3.60	3.60	3.775	3.925	4.05
Mar.	3.35	3.60	3.60	3.775	3.925	4.05
Apr.	3.35	3.60	3.60	3.775	3.925	4.05
May	3.35	3.60	3.60	3.775	3.925	4.05
June	3.35	3.60	3.60	3.838	3.925	4.05
July	3.35	3.60	3.635	3.925	4.042	4.26
Aug.	3.35	3.60	3.775	3.925	4.05	4.325
Sept.	3.35	3.60	3.775	3.925	4.05	4.325
Oct.	3.35	3.60	3.775	3.925	4.05	4.325
Nov.	3.35	3.60	3.775	3.925	4.05	4.325
Dec.	3.60	3.60	3.775	3.925	4.05	4.325
Average	3.37	3.60	3.676	3.855	3.987	4.189

* 1941-1944 = 2.10¢.

HOT-ROLLED STRIP

At Pittsburgh, Cents Per Pound

	1939	1940†	1946*	1947	1948	1949
Jan.	2.15	2.10	2.10	2.50	2.80	3.28
Feb.	2.15	2.10	2.23	2.50	2.80	3.28
Mar.	2.15	2.10	2.35	2.50	2.80	3.28
Apr.	2.15	1.98	2.35	2.50	2.80	3.26
May	2.05	2.10	2.35	2.50	2.80	3.25
June	2.00	2.10	2.35	2.50	2.80	3.25
July	2.00	2.10	2.35	2.58	2.90	3.25
Aug.	2.00	2.10	2.35	2.80	3.28	3.25
Sept.	2.00	2.10	2.35	2.80	3.28	3.25
Oct.	2.00	2.10	2.35	2.80	3.28	3.25
Nov.	2.02	2.10	2.35	2.80	3.28	3.25
Dec.	2.10	2.10	2.47	2.80	3.28	3.25
Average	2.06	2.09	2.33	2.63	3.03	3.26

	1950	1951	1952	1953	1954	1955
Jan.	3.25	3.50	3.50	3.725	3.925	4.05
Feb.	3.25	3.50	3.50	3.725	3.925	4.05
Mar.	3.25	3.50	3.50	3.725	3.925	4.05
Apr.	3.25	3.50	3.50	3.725	3.925	4.05
May	3.25	3.50	3.50	3.725	3.925	4.05
June	3.25	3.50	3.50	3.810	3.925	4.05
July	3.25	3.50	3.545	3.925	4.042	4.256
Aug.	3.25	3.50	3.725	3.925	4.05	4.325
Sept.	3.25	3.50	3.725	3.925	4.05	4.325
Oct.	3.25	3.50	3.725	3.925	4.05	4.325
Nov.	3.25	3.50	3.725	3.925	4.05	4.325
Dec.	3.50	3.50	3.725	3.925	4.05	4.325
Average	3.27	3.50	3.608	3.832	3.987	4.181

* Over 6 in.; add 0.10¢ for 6 in. and under from February through November 1946.
† 1941-1945 = 2.10¢.

STEEL PLATES

At Pittsburgh, Cents Per Pound

	1938*	1945*	1946	1947	1948	1949
Jan.	2.25	2.10	2.25	2.65	2.95	3.50
Feb.	2.25	2.10	2.38	2.65	2.95	3.50
Mar.	2.25	2.20	2.50	2.65	2.95	3.50
Apr.	2.25	2.20	2.50	2.65	2.95	3.50
May	2.25	2.21	2.50	2.65	2.93	3.40
June	2.22	2.25	2.50	2.71	2.93	3.40
July	2.10	2.25	2.50	2.95	3.07	3.40
Aug.	2.10	2.25	2.50	2.95	3.50	3.40
Sept.	2.10	2.25	2.50	2.95	3.50	3.40
Oct.	2.10	2.25	2.50	2.95	3.50	3.40
Nov.	2.10	2.25	2.50	2.95	3.50	3.40
Dec.	2.10	2.25	2.50	2.95	3.50	3.44
Average	2.17	2.21	2.47	2.80	3.19	3.43

	1950	1951	1952	1953	1954	1955
Jan.	3.50	3.70	3.70	3.90	4.10	4.225
Feb.	3.50	3.70	3.70	3.90	4.10	4.225
Mar.	3.50	3.70	3.70	3.90	4.10	4.225
Apr.	3.50	3.70	3.70	3.90	4.10	4.225
May	3.50	3.70	3.70	3.90	4.10	4.225
June	3.50	3.70	3.70	3.98	4.10	4.225
July	3.50	3.70	3.74	4.10	4.217	4.431
Aug.	3.50	3.70	3.90	4.10	4.225	4.50
Sept.	3.50	3.70	3.90	4.10	4.225	4.50
Oct.	3.50	3.70	3.90	4.10	4.225	4.50
Nov.	3.50	3.70	3.90	4.10	4.225	4.50
Dec.	3.70	3.70	3.90	4.10	4.225	4.50
Average	3.52	3.70	3.78	4.01	4.162	4.356

* 1939-1944 = 2.10¢.

HIGH SPEED TOOL STEEL

18-4-1, Cents Per Pound

	1949	1950	1951	1952	1953	1954	1955
Jan.	90.5	100.0	116.8	150.5	157.57	152.50	154.00
Feb.	90.5	110.0	123.5	150.5	157.57	148.00	154.00
Mar.	90.5	100.0	123.5	150.5	157.57	148.00	154.00
Apr.	90.5	100.0	123.5	150.5	157.57	148.00	154.00
May	90.5	100.0	123.5	150.5	157.57	148.00	154.00
June	90.5	100.0	123.5	150.5	161.11	148.00	154.00
July	93.5	100.0	123.5	151.91	166.00	151.00	157.00
Aug.	90.5	100.0	150.5	157.57	166.00	154.00	160.00
Sept.	90.5	100.0	150.5	157.57	166.00	154.00	160.00
Oct.	90.5	100.0	150.5	157.57	166.00	154.00	160.00
Nov.	90.5	100.0	150.5	157.57	166.00	154.00	160.00
Dec.	90.5	110.0	150.5	157.57	166.00	154.00	160.00
Average	90.5	100.8	134.19	153.56	162.08	151.13	156.75

TINPLATE AT PITTSBURGH Dollars Per Base Box, 1.50-lb Coating

	1933	1934	1936	1937	1938*	1947*	1948
Jan.	$4.25	$5.25	$5.25	$4.85	$5.35	$5.75	$6.80
Feb.	4.25	5.25	5.25	4.85	5.35	5.75	6.80
Mar.	4.25	5.25	5.25	4.85	5.35	5.75	6.80
Apr.	4.25	5.25	5.25	5.35	5.35	5.75	6.80
May	4.25	5.25	5.25	5.35	5.35	5.75	6.70
June	4.25	5.25	5.25	5.35	5.35	5.75	6.70
July	4.25	5.25	5.25	5.35	5.35	5.75	6.72
Aug.	4.25	5.25	5.25	5.35	5.35	5.75	6.80
Sept.	4.65	5.25	5.25	5.35	5.35	5.75	6.80
Oct.	4.65	5.25	5.25	5.35	5.35	5.75	6.80
Nov.	4.65	5.25	5.25	5.35	5.18	5.75	6.80
Dec.	5.25	5.25	5.25	5.35	5.00	5.75	6.80
Average	4.43	5.25	5.25	5.22	5.31	5.75	6.77

* 1939-1946 = $5.00.

	1949	1950	1951	1952	1953	1954	195
Jan.	$7.75	$7.50	$8.10	$8.70	$8.95	$8.95	$9.05
Feb.	7.75	7.50	8.70	8.70	8.95	8.95	9.05
Mar.	7.75	7.50	8.70	8.70	8.95	8.95	9.05
Apr.	7.75	7.50	8.70	8.70	8.95	8.95	9.05
May	7.75	7.50	8.70	8.70	8.95	8.95	9.05
June	7.75	7.50	8.70	8.70	8.95	8.95	9.05
July	7.75	7.50	8.70	8.75	8.95	8.96	9.05
Aug.	7.75	7.50	8.70	8.95	8.95	8.95	9.05
Sept.	7.75	7.50	8.70	8.95	8.95	8.95	9.05
Oct.	7.75	7.50	8.70	8.95	8.95	9.05	9.45
Nov.	7.75	7.50	8.70	8.95	8.95	9.05	9.45
Dec.	7.75	7.50	8.70	8.95	8.95	9.05	9.45
Average	7.75	7.50	8.67	8.81	8.95	8.98	9.15

Steel Industry

Steel Prices: Hot-rolled and cold-finished bars, wire structurals, rails, pipe and stainless steel sheets.

MERCHANT BARS

At Pittsburgh, Cents Per Pound

	1939*	1945*	1946	1947	1948	1949
Jan.	2.25	2.15	2.25	2.60	2.90	3.45
Feb.	2.25	2.15	2.38	2.60	2.90	3.45
Mar.	2.25	2.15	2.50	2.60	2.90	3.43
Apr.	2.25	2.15	2.50	2.60	2.90	3.35
May	2.19	2.17	2.50	2.60	2.87	3.35
June	2.15	2.25	2.50	2.60	2.87	3.35
July	2.15	2.25	2.50	2.66	3.00	3.35
Aug.	2.15	2.25	2.50	2.90	3.45	3.35
Sept.	2.15	2.25	2.50	2.90	3.45	3.35
Oct.	2.15	2.25	2.50	2.90	3.45	3.35
Nov.	2.15	2.25	2.50	2.90	3.45	3.39
Dec.	2.15	2.25	2.58	2.90	3.45	3.38
Average	2.19	2.21	2.47	2.73	3.13	3.37

	1950	1951	1952	1953	1954	1955
Jan.	3.45	3.70	3.70	3.95	4.15	4.30
Feb.	3.45	3.70	3.70	3.95	4.15	4.30
Mar.	3.45	3.70	3.70	3.95	4.15	4.30
Apr.	3.45	3.70	3.70	3.95	4.15	4.30
May	3.45	3.70	3.70	3.95	4.15	4.30
June	3.45	3.70	3.70	4.04	4.15	4.30
July	3.45	3.70	3.75	4.15	4.29	4.56
Aug.	3.45	3.70	3.95	4.15	4.30	4.65
Sept.	3.45	3.70	3.95	4.15	4.30	4.65
Oct.	3.45	3.70	3.95	4.15	4.30	4.65
Nov.	3.45	3.70	3.95	4.15	4.30	4.65
Dec.	3.70	3.70	3.95	4.15	4.30	4.65
Average	3.47	3.70	3.79	4.06	4.22	4.46

* 1940-1944 = 2.15¢.

MANUFACTURER'S BRIGHT WIRE

At Pittsburgh, Cents Per Pound

	1938*	1945*	1946	1947	1948	1949
Jan.	2.90	2.60	2.75	3.30	3.55	4.33
Feb.	2.90	2.60	2.90	3.30	3.55	4.33
Mar.	2.90	2.60	3.05	3.30	3.55	4.22
Apr.	2.96	2.60	3.05	3.30	3.55	4.15
May	2.90	2.63	3.05	3.30	3.60	4.15
June	2.84	2.75	3.05	3.30	3.60	4.15
July	2.90	2.75	3.05	3.35	3.77	4.15
Aug.	2.60	2.75	3.05	3.55	4.33	4.15
Sept.	2.60	2.75	3.05	3.55	4.33	4.15
Oct.	2.60	2.75	3.05	3.55	4.33	4.15
Nov.	2.60	2.75	3.05	3.55	4.33	4.15
Dec.	2.60	2.75	3.10	3.55	4.33	4.29
Average	2.74	2.69	3.02	3.41	3.90	4.20

	1953	1951	1952	1953	1954	1955
Jan.	4.50	4.85	4.85	5.225	5.525	5.75
Feb.	4.50	4.85	4.85	5.225	5.525	5.75
Mar.	4.50	4.85	4.85	5.225	5.525	5.75
Apr.	4.50	4.85	4.85	5.225	5.525	5.75
May	4.50	4.85	4.85	5.225	5.525	5.75
June	4.50	4.85	4.85	5.352	5.525	5.75
July	4.50	4.85	4.925	5.525	5.735	6.125
Aug.	4.60	4.85	5.225	5.525	5.75	6.25
Sept.	4.50	4.85	5.225	5.525	5.75	6.25
Oct.	4.50	4.85	5.225	5.525	5.75	6.25
Nov.	4.50	4.85	5.225	5.525	5.75	6.25
Dec.	4.85	4.85	5.225	5.525	5.75	6.25
Average	4.53	4.85	5.012	5.386	5.636	5.989

* 1939-1944 = 2.60¢.

COLD-FINISHED STEEL BARS

At Pittsburgh, Cents Per Pound

	1939*	1945*	1946	1947	1948	1949
Jan.	2.70	2.65	2.75	3.20	3.55	3.98
Feb.	2.70	2.65	2.93	3.20	3.55	3.98
Mar.	2.70	2.65	3.10	3.20	3.55	3.98
Apr.	2.70	2.65	3.10	3.20	3.55	3.98
May	2.68	2.65	3.10	3.20	3.50	3.98
June	2.65	2.65	3.10	3.20	3.50	3.98
July	2.65	2.65	3.10	3.27	3.82	3.98
Aug.	2.65	2.73	3.10	3.55	3.98	3.98
Sept.	2.65	2.75	3.10	3.55	3.98	3.98
Oct.	2.65	2.75	3.10	3.55	3.98	3.98
Nov.	2.65	2.75	3.10	3.55	3.98	3.98
Dec.	2.65	2.75	3.10	3.55	3.98	4.01
Average	2.67	2.69	3.06	3.35	3.74	3.98

	1950	1951	1952	1953	1954	1955
Jan.	4.145	4.55	4.55	4.925	5.20	5.40
Feb.	4.145	4.55	4.55	4.925	5.20	5.40
Mar.	4.145	4.55	4.55	4.925	5.20	5.40
Apr.	4.145	4.55	4.55	4.925	5.20	5.40
May	4.145	4.56	4.55	4.925	5.20	5.40
June	4.145	4.55	4.55	5.041	5.20	5.40
July	4.145	4.55	4.625	5.20	5.39	5.77
Aug.	4.145	4.55	4.925	5.20	5.40	5.90
Sept.	4.145	4.55	4.925	5.20	5.40	5.90
Oct.	4.148	4.55	4.925	5.20	5.40	5.90
Nov.	4.15	4.55	4.925	5.20	5.40	5.90
Dec.	4.55	4.55	4.925	5.20	5.40	5.90
Average	4.179	4.55	4.712	5.072	5.30	5.63

* 1940-1944 = 2.65¢.

STRUCTURAL STEEL SHAPES

At Pittsburgh, Cents Per Pound

	1937	1938*	1946*	1947	1948	1949
Jan.	2.05	2.25	2.10	2.50	2.80	3.25
Feb.	2.05	2.25	2.23	2.50	2.80	3.25
Mar.	2.21	2.25	2.35	2.50	2.80	3.25
Apr.	2.25	2.25	2.35	2.50	2.80	3.25
May	2.25	2.25	2.35	2.50	2.75	3.25
June	2.25	2.22	2.35	2.50	2.75	3.25
July	2.25	2.10	2.35	2.56	2.85	3.25
Aug.	2.25	2.10	2.35	2.80	3.25	3.25
Sept.	2.25	2.10	2.35	2.80	3.25	3.25
Oct.	2.25	2.10	2.35	2.80	3.25	3.25
Nov.	2.25	2.10	2.35	2.80	3.25	3.25
Dec.	2.25	2.10	2.35	2.80	3.25	3.31
Average	2.21	2.17	2.32	2.63	3.00	3.26

	1950	1951	1952	1953	1954	1955
Jan.	3.40	3.65	3.65	3.85	4.10	4.25
Feb.	3.40	3.65	3.65	3.85	4.10	4.25
Mar.	3.40	3.65	3.65	3.85	4.10	4.25
Apr.	3.40	3.65	3.65	3.85	4.10	4.25
May	3.40	3.65	3.65	3.85	4.10	4.25
June	3.40	3.65	3.65	3.96	4.10	4.25
July	3.40	3.65	3.69	4.10	4.24	4.51
Aug.	3.40	3.65	3.85	4.10	4.25	4.60
Sept.	3.40	3.65	3.85	4.10	4.25	4.60
Oct.	3.40	3.65	3.85	4.10	4.25	4.60
Nov.	3.40	3.65	3.85	4.10	4.25	4.60
Dec.	3.65	3.65	3.85	4.10	4.25	4.60
Average	3.42	3.65	3.74	3.98	4.17	4.41

* 1939-1945 = 2.10¢.

BUTTWELD STEEL PIPE

At Pittsburgh, Per Net Ton, Carload Lots

	1937	1938*	1946*	1947	1948	1949
Jan.	$61.00	$71.00	$63.00	$79.00	$88.00	$103.00
Feb.	61.00	71.00	68.00	79.00	91.50	103.00
Mar.	69.00	71.00	69.00	79.00	95.00	103.00
Apr.	71.00	71.00	69.00	79.00	95.00	103.00
May	71.00	71.00	69.00	79.00	94.00	103.00
June	71.00	71.00	69.00	79.00	93.00	103.00
July	71.00	63.00	69.00	79.00	95.00	103.00
Aug.	71.00	63.00	69.00	88.00	103.00	103.00
Sept.	71.00	63.00	69.00	88.00	103.00	103.00
Oct.	71.00	63.00	69.00	88.00	103.00	103.00
Nov.	71.00	63.00	69.00	88.00	103.00	103.00
Dec.	71.00	63.00	71.00	88.00	103.00	105.00
Average	69.17	67.00	68.42	82.75	97.21	103.17

	1950	1951	1952	1953	1954	1955
Jan.	$108.00	$117.00	$117.00	$124.00	$136.50	$141.50
Feb.	108.00	117.00	117.00	124.00	136.50	141.50
Mar.	108.00	117.00	117.00	124.00	136.50	141.50
Apr.	108.00	117.00	117.00	124.00	136.50	141.50
May	108.00	117.00	117.00	125.88	136.50	141.50
June	108.00	117.00	117.00	132.75	136.50	141.50
July	108.00	117.00	118.75	136.50	141.18	151.75
Aug.	108.00	117.00	124.00	136.50	141.50	154.00
Sept.	108.00	117.00	124.00	136.50	141.50	154.00
Oct.	108.00	117.00	124.00	136.50	141.50	154.00
Nov.	108.00	117.00	124.00	136.50	141.50	154.00
Dec.	117.00	117.00	124.00	136.50	141.50	154.00
Average	108.75	117.00	120.08	131.14	138.97	147.56

* 1939-1945 = $63.00.
Computed from list discounts, for carload lots: 1-in. size, Standard, T. & C.

CAST IRON WATER PIPE

At New York, Net Ton, 6-in. and Larger

	1938	1939*	1946*	1947	1948	1949
Jan.	$53.00	$49.00	$57.20	$73.60	$89.18	$105.95
Feb.	53.00	49.00	57.20	73.75	89.18	105.95
Mar.	53.00	49.00	60.20	76.80	89.18	105.95
Apr.	53.00	49.00	62.20	79.80	89.18	103.98
May	53.00	49.00	62.20	79.80	92.34	94.95
June	52.20	49.00	62.20	79.80	95.50	94.95
July	49.00	49.00	69.80	80.50	95.50	94.95
Aug.	49.00	49.00	69.80	83.30	103.88	94.95
Sept.	49.00	49.00	69.80	83.30	105.95	94.95
Oct.	49.00	52.20	69.80	83.96	105.95	94.95
Nov.	49.00	52.20	69.80	84.18	105.95	94.95
Dec.	49.00	52.20	73.60	84.18	105.95	94.95
Average	50.93	49.80	65.23	80.25	97.31	98.45

	1950	1951	1952	1953	1954	1955
Jan.	$94.95	$105.00	$109.00	$114.00	$115.50	$118.90
Feb.	92.36	109.00	109.00	114.00	115.50	118.90
Mar.	91.50	109.00	109.00	114.00	115.50	118.90
Apr.	91.50	109.00	109.00	114.00	115.50	118.90
May	91.50	109.00	109.00	114.00	115.50	116.50
June	91.50	109.00	109.00	114.00	115.50	116.50
July	91.50	109.00	109.00	115.50	115.50	116.50
Aug.	91.50	109.00	109.00	115.50	115.50	116.50
Sept.	91.50	109.00	111.50	115.50	115.50	121.50
Oct.	95.00	109.00	114.00	115.50	115.50	121.50
Nov.	95.00	109.00	114.00	115.50	115.90	121.50
Dec.	98.00	109.00	114.00	115.50	115.50	*121.50
Average	92.98	108.67	110.46	114.75	115.50	118.98

* 1940-1945 = $52.20. † U. S. Pipe and Foundry Index

STEEL RAILS AT PITTSBURGH. No. 1 OH

Including Prices by Months and Yearly Averages in Dollars Per 100 lb*

	1936	1937	1938†	1945†	1946	1947	1948
Jan.	$36.37	$39.00	$42.50	$40.00	$43.00	$2.50	$2.75
Feb.	36.37	39.00	42.50	40.00	*43.19	2.80	2.75
Mar.	36.37	41.80	42.50	42.25	43.39	2.50	2.75
Apr.	36.37	42.50	42.50	43.00	43.39	2.50	2.75
May	36.37	42.50	42.50	43.00	43.39	2.50	2.70
June	36.37	42.50	42.50	43.00	43.39	2.50	2.70
July	36.37	42.50	42.50	43.00	43.39	2.50	2.80
Aug.	36.37	42.50	42.50	43.00	43.39	2.75	3.20
Sept.	36.37	42.80	41.25	43.00	43.39	2.75	3.20
Oct.	36.37	42.50	40.00	43.00	43.39	2.75	3.20
Nov.	36.37	42.50	40.00	43.00	43.39	2.75	3.20
Dec.	39.00	42.50	40.00	43.00	47.36	2.75	3.20
Average	36.59	41.88	41.77	42.44	43.67	2.60	2.93

	1949	1950	1951	1952	1953	1954	1955
Jan.	$3.20	$3.40	$3.60	$3.60	$3.775	$4.325	$4.445
Feb.	3.20	3.40	3.60	3.60	3.775	4.325	4.445
Mar.	3.20	3.40	3.60	3.60	3.775	4.325	4.445
Apr.	3.20	3.40	3.60	3.60	3.775	4.325	4.445
May	3.20	3.40	3.60	3.60	3.991	4.325	4.445
June	3.20	3.40	3.60	3.60	4.181	4.325	4.445
July	3.20	3.40	3.60	3.635	4.325	4.442	4.655
Aug.	3.20	3.40	3.60	3.775	4.325	4.445	4.725
Sept.	3.20	3.40	3.60	3.775	4.325	4.445	4.725
Oct.	3.20	3.40	3.60	3.775	4.325	4.445	4.725
Nov.	3.20	3.40	3.60	3.775	4.325	4.445	4.725
Dec.	3.28	3.60	3.60	3.775	4.325	4.445	4.725
Average	3.21	3.42	3.60	3.676	4.102	4.387	4.579

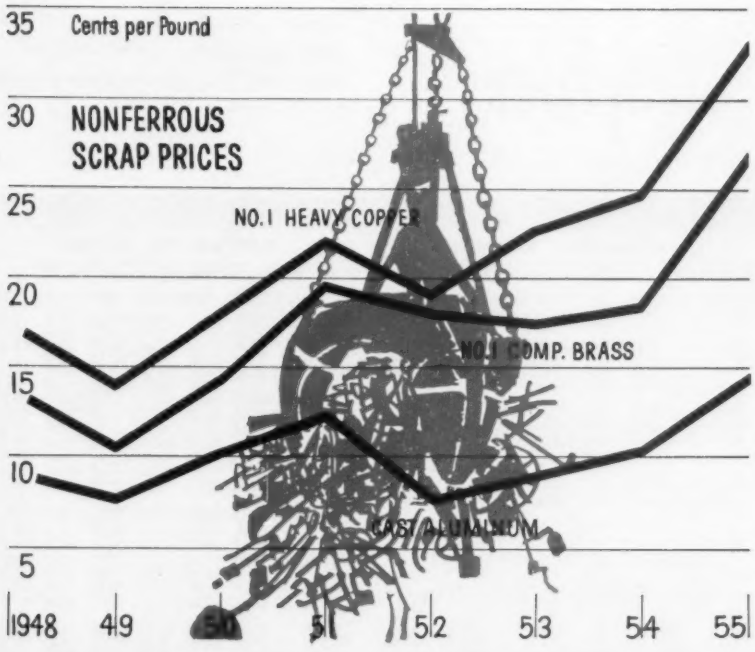
*Prices quoted dollars per gross ton prior to Feb. 15, 1946. Net ton, Feb. 15 to Dec. 13, 1946.
† 1939-1944 = $40.00 per gross ton.

STAINLESS STEEL SHEETS

No. 304, Cents Per Pound

	1949	1950	1951	1952	1953	1954	1955
Jan.	41.25	39.50	43.00	43.25	45.28	48.75	44.50
Feb.	41.25	39.50	43.00	43.25	45.28	48.75	44.50
Mar.	41.25	39.50	43.00	43.25	45.59	48.75	44.50
Apr.	40.61	39.50	43.00	43.25	46.50	48.75	44.50
May	39.50	39.50	43.00	43.25	46.50	45.63	44.50
June	39.50	39.50	43.00	43.25	47.46	43.75	44.50
July	39.50	40.52	43.25	43.67	48.75	43.75	46.56
Aug.	39.50	41.00	43.25	45.28	48.75	43.75	47.25
Sept.	39.50	41.00	43.25	45.28	48.75	43.75	47.25
Oct.	39.50	41.00	43.25	45.28	48.75	43.75	47.25
Nov.	39.50	41.00	43.25	45.28	48.75	43.75	47.25
Dec.	39.50	43.00	43.25	45.28	48.75	44.26	47.25
Average	40.06	40.38	43.125	44.13	47.43	45.62	45.81

Prices: Straits tin, electrolytic



Nonferrous Metals Powders

ALUMINUM SCRAP, CAST

Cents Per Pound, f.o.b. New York*

	1950	1951	1952	1953	1954	1955
Jan.	7.38	15.55	7.75	7.75	8.88	11.50
Feb.	7.25	15.50	7.75	8.63	8.50	12.94
Mar.	7.25	15.63	7.75	9.50	8.85	14.75
Apr.	7.38	16.88	7.75	9.13	10.25	14.63
May	7.88	17.25	7.75	8.25	11.00	12.85
June	8.65	17.25	7.25	9.20	10.00	12.00
July	8.75	8.15	7.25	10.00	10.00	14.38
Aug.	9.88	7.75	7.25	9.25	10.00	16.50
Sept.	12.00	7.75	7.25	9.00	10.75	17.10
Oct.	13.88	7.75	7.75	8.25	11.00	17.13
Nov.	15.15	7.75	7.75	9.63	11.00	17.13
Dec.	15.75	7.75	7.75	10.30	11.00	17.13
Average	10.10	12.08	7.51	9.07	10.10	14.84

* Dealers' Buying Price.

BRASS SCRAP, No. 1 COMPOSITION

Cents Per Pound, f.o.b. New York*

	1950	1951	1952	1953	1954	1955
Jan.	11.13	17.25	18.25	17.75	16.44	21.31
Feb.	11.13	18.75	18.25	18.63	15.75	23.19
Mar.	11.13	20.50	18.25	19.10	17.00	24.10
Apr.	11.50	22.19	18.25	18.56	17.75	25.88
May	12.44	22.50	18.25	18.81	18.88	24.90
June	13.95	21.31	17.75	16.75	19.25	24.94
July	14.13	19.15	17.75	16.75	19.25	26.69
Aug.	15.50	18.50	17.75	15.44	19.25	28.81
Sept.	17.25	18.25	17.75	15.50	19.44	30.25
Oct.	17.75	18.25	17.74	16.06	20.03	29.31
Nov.	18.88	18.25	17.75	16.81	20.70	30.30
Dec.	18.59	18.25	17.75	17.35	21.00	31.75
Average	14.28	19.43	17.96	17.13	18.73	26.79

* Dealers' Buying Price.

No. 1 HEAVY COPPER SCRAP

Cents Per Pound, f.o.b. New York*

	1950	1951	1952	1953	1954	1955
Jan.	13.97	19.75	19.00	19.00	22.63	27.00
Feb.	14.06	21.08	19.00	21.25	22.63	29.19
Mar.	13.88	23.88	19.00	25.70	23.50	30.15
Apr.	14.19	25.88	19.00	23.75	24.00	31.44
May	15.13	26.00	19.00	21.81	24.63	31.05
June	16.98	23.88	19.00	23.15	24.75	33.00
July	16.94	18.90	19.00	23.00	24.75	33.75
Aug.	18.86	19.00	19.00	21.25	24.75	35.63
Sept.	20.38	19.00	19.00	21.50	24.94	38.65
Oct.	22.25	19.00	19.00	22.13	25.63	36.59
Nov.	24.75	19.00	19.00	23.38	25.75	38.25
Dec.	19.75	19.00	19.00	23.55	26.63	41.00
Average	17.58	21.20	19.00	22.46	24.55	33.82

* Dealers' Buying Price.

BRASS INGOTS, 85-5-5-5

No. 115, Cents Per Pound, Cars*

	1950	1951	1952	1953	1954	1955
Jan.	17.50	29.00	27.25	27.25	24.50	30.38
Feb.	17.50	29.00	27.25	27.81	23.75	32.81
Mar.	17.50	29.00	27.25	29.50	23.50	33.80
Apr.	17.81	29.00	27.25	28.00	25.75	37.00
May	18.41	29.00	27.25	26.00	26.50	35.30
June	21.33	29.00	27.25	26.00	27.00	34.50
July	22.11	29.00	27.25	25.63	27.00	36.50
Aug.	23.80	29.00	27.25	24.50	27.45	39.19
Sept.	25.50	27.69	27.25	24.50	28.13	42.50
Oct.	26.63	27.25	27.25	24.50	29.19	41.75
Nov.	28.60	27.25	27.25	24.50	29.50	41.75
Dec.	29.00	27.25	27.25	24.50	30.00	42.00
Average	21.14	28.45	27.25	26.06	26.86	37.29

* Delivered.

INGOT BRASS AND BRONZE

Short Tons of Shipments, Monthly

	1951	1952	1953	1954	1955
Jan.	28,416	28,315	24,423	20,661	25,201
Feb.	27,168	24,211	25,429	19,920	25,349
Mar.	31,987	23,890	28,256	23,653	29,713
Apr.	30,472	22,547	25,044	24,748	27,641
May	33,267	21,740	21,660	22,269	23,708
June	33,817	21,274	20,818	22,348	23,141
July	32,016	18,947	19,321	17,074	18,513
Aug.	25,285	21,807	20,156	21,684	27,013
Sept.	22,235	22,770	21,463	22,464	26,349
Oct.	23,124	26,811	22,820	24,080	25,226
Nov.	23,544	23,441	21,860	23,061	24,970*
Dec.	20,987	22,983	20,541	21,273	24,000*
Total	332,376	277,736	271,251	263,233	300,826

* Estimate.

Source: Ingot Brass & Bronze Institute.

BRONZE INGOTS, 88-10-2

No. 245, Cents Per Pound, Cars*

	1950	1951	1952	1953	1954	1955
Jan.	19.63	36.00	33.70	34.50	29.50	35.13
Feb.	19.63	36.00	34.50	34.88	28.75	37.56
Mar.	19.63	36.75	34.50	36.09	28.50	38.95
Apr.	20.00	37.00	34.50	33.56	31.94	42.25
May	20.72	37.00	34.50	30.25	32.75	40.55
June	23.70	37.00	34.50	30.25	33.25	39.75
July	24.38	37.00	34.50	30.06	33.25	41.75
Aug.	27.55	37.00	34.50	29.50	33.40	45.50
Sept.	29.88	34.38	34.50	29.50	33.69	48.75
Oct.	32.50	33.50	34.50	29.50	34.50	48.00
Nov.	36.20	33.50	34.50	29.50	34.75	48.00
Dec.	37.00	33.50	34.50	29.50	34.75	48.75
Average	29.50	35.72	34.43	31.42	32.42	42.91

* Delivered.

CADMIUM PRICES, STICKS, BARS

Dollars Per Pound, 1 to 5-Ton Lots

June 3, 1943 to July 17, 1946	$0.90
July 18, 1946 to November 20, 1946	1.25
November 21, 1946 to December 4, 1946	1.37½
December 5, 1946 to February 19, 1947	1.50
February 20, 1947 to August 11, 1948	1.75
August 12, 1948 to November 17, 1948	1.90
November 18, 1948 to June 14, 1950	2.00
June 15, 1950 to September 10, 1950	2.15
September 11, 1950 to November 30, 1950	2.40
December 2, 1950 to May 26, 1952	2.55
May 27, 1952 to August 5, 1952	2.25
August 6, 1952 to November 30, 1952	2.00
December 1, 1952 to December 13, 1952	1.50–2.00
December 13, 1952 to January 24, 1953	1.75–2.00
January 26, 1953 to January 31, 1954	2.00
February 1, 1954 to December 31, 1955	1.70

COBALT, 97 TO 99 PCT.

Per Pound, 500 to 550 lb Lots Since 1940

1940 to June 30, 1947[1]	$1.50
July 1, 1947 to March 31, 1949	1.65
April 1, 1949 to December 31, 1950	1.80
January 2, 1951 to October 1, 1951	2.10
October 1, 1951 to October 31 1953	2.40
November 2, 1953 to December 31, 1955	2.60

[1] 100 lb lots.

REMELT ALUMINUM INGOT

No. 12, Cents Per Pound, Cars*

	1950	1951	1952	1953	1954	1955
Jan.	16.50	30.60	19.50	19.50	19.38	23.44
Feb.	16.50	30.25	19.50	20.25	18.66	25.98
Mar.	16.30	30.50	19.50	22.47	19.18	29.65
Apr.	16.06	30.75	19.50	22.75	20.75	29.38
May	16.75	30.75	19.50	22.28	20.38	26.70
June	17.73	30.75	19.50	22.70	19.50	26.00
July	18.13	19.50	18.90	22.59	19.50	26.69
Aug.	21.85	19.50	19.20	22.13	19.78	29.69
Sept.	26.25	19.50	19.50	21.83	20.19	30.35
Oct.	27.06	19.50	19.50	20.28	20.81	30.75
Nov.	20.175	19.50	19.50	20.34	20.88	31.00
Dec.	31.00	19.50	19.50	20.20	21.13	31.25
Average	21.19	25.05	19.42	21.44	20.00	28.41

* Delivered.

Nonferrous

Prices: Straits tin, electrolytic copper, nickel, aluminum, antimony and U.S. primary aluminum production.

STRAITS TIN, PROMPT PRICE

Cents Per Pound, at New York

	1940	1941†	1946	1947	1948	1949
Jan.	46.73	50.16	52.00	70.00	94.00	$1.03
Feb.	45.85	51.41	52.00	72.00	94.00	$1.03
Mar.	47.07	52.07	52.00	70.00	94.00	$1.03
Apr.	46.96	52.03	52.00	80.00	94.00	$1.03
May	51.51	52.18	52.00	80.00	94.00	$1.03
June	54.64	52.68	52.00	80.00	$1.03	$1.03
July	51.61	53.41	52.00	80.00	$1.03	$1.03
Aug.	51.21	52.45	52.00	80.00	$1.03	$1.03
Sept.	50.30	52.00	52.00	80.00	$1.03	$1.02
Oct.	51.50	52.00	52.00	80.00	$1.03	95.49
Nov.	50.57	52.00	61.00	80.00	$1.03	90.11
Dec.	50.11	52.00	70.00	85.38	$1.03	79.06
Average	49.84	52.03	54.00	77.95	99.25	99.22
	1950	1951	1952	1953	1954	1955
Jan.	75.75	$1.72	$1.097	$1.215	84.83	97.28
Feb.	74.50	$1.83	$1.215	$1.215	85.04	90.76
Mar.	75.62	$1.45	$1.215	$1.214	91.88	91.04
Apr.	76.38	$1.46	$1.215	$1.011	96.13	91.40
May	77.60	$1.40	$1.215	97.50	94.51	91.37
June	77.70	$1.18	$1.215	92.92	94.19	96.64
July	89.88	$1.06	$1.215	81.90	96.54	96.79
Aug.	$1.02	$1.03	$1.212	80.71	93.39	95.38
Sept.	$1.01	$1.03	$1.213	82.36	93.52	96.48
Oct.	$1.13	$1.03	$1.212	80.86	93.05	96.21
Nov.	$1.38	$1.03	$1.213	83.11	91.14	99.05
Dec.	$1.45	$1.03	$1.215	84.61	88.57	108.0
Average	95.53	$1.27	$1.204	95.79	91.84*	95.04*

* Tentative. † 1942-1945, incl.: 52.00.

ANTIMONY, U. S. METAL

Cents Per Pound, F.O.B. Laredo, Tex.

	1950	1951	1952	1953	1954	1955
Jan.	30.05	34.50	50.00	34.50	28.50	28.50
Feb.	27.75	42.00	50.00	34.50	28.50	28.50
Mar.	24.50	42.00	50.00	34.50	28.50	28.50
Apr.	24.50	42.00	50.00	34.50	28.50	28.50
May	24.50	42.00	42.75	34.50	28.50	28.50
June	24.50	42.00	39.00	34.50	28.50	28.50
July	24.50	42.00	39.00	34.50	28.50	28.50
Aug.	24.50	42.00	39.00	34.50	28.50	29.75
Sept.	31.13	42.00	38.00	34.50	28.50	33.50
Oct.	32.00	42.00	39.00	34.50	28.50	33.50
Nov.	32.00	45.20	35.63	33.72	28.50	33.50
Dec.	32.00	50.00	34.50	28.50	28.50	33.50
Average	27.86	42.31	42.32	33.94	28.50	30.27

MAGNESIUM, 99.8 PCT INGOT

Cents Per Pound, at Freeport, Tex.

1930	48.00	1939	27.00	1948	20.50	
1931	34.00	1940	27.00	1949	20.50	
1932	29.00	1941	27.00	1950	22.02	
1933	28.00	1942	22.50	1951	24.50	
1934	26.00	1943	20.50	1952	24.50	
1935	30.00	1944	20.50	1953	26.94	
1936	30.00	1945	20.50	1954	27.75	
1937	30.00	1946	20.50	1955	30.44	
1938	30.00	1947	20.50			

ELECTROLYTIC COPPER

Cents Per Pound, Conn. Valley

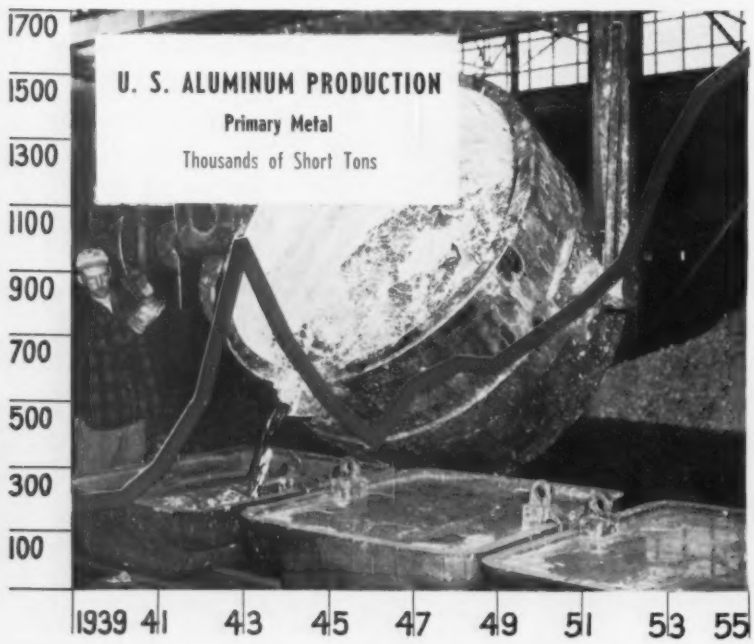
	1939	1940*	1946*	1947	1948	1949
Jan.	11.25	12.22	12.00	19.56	21.50	23.50
Feb.	11.25	11.40	12.00	19.75	21.50	23.50
Mar.	11.25	11.38	12.00	21.50	21.50	23.49
Apr.	10.47	11.33	12.00	21.50	21.50	21.72
May	10.06	11.32	12.00	22.63	21.50	18.06
June	10.00	11.37	14.26	21.63	21.50	16.66
July	10.22	10.61	14.375	21.50	21.50	17.33
Aug.	10.49	10.95	14.375	21.50	23.43	17.63
Sept.	11.93	11.54	14.375	21.50	23.50	17.63
Oct.	12.44	12.00	14.375	21.50	23.50	17.63
Nov.	12.50	12.00	17.19	21.50	23.50	18.42
Dec.	12.50	12.00	19.50	21.50	23.50	18.50
Average	11.20	11.53	14.04	21.30	22.33	19.51
	1950	1951	1952	1953	1954	1955
Jan.	18.50	24.50	24.50	24.50	29.75	30.17
Feb.	18.50	24.50	24.50	25.41	29.75	33.00
Mar.	18.50	24.50	24.50	30.58	29.87	33.22
Apr.	18.94	24.50	24.50	30.70	29.97	36.00
May	19.92	24.50	24.50	29.85	30.00	36.00
June	22.27	24.50	24.50	29.88	30.00	36.00
July	22.50	24.50	24.50	29.88	30.00	36.00
Aug.	22.54	24.50	24.50	29.39	30.00	38.26
Sept.	23.25	24.50	24.50	29.50	30.00	43.00
Oct.	24.50	24.50	24.50	29.61	30.00	43.00
Nov.	24.50	24.50	24.50	29.75	30.00	43.00
Dec.	24.50	24.50	24.50	29.75	30.00	43.00
Average	21.54	24.50	24.50	29.67	29.95	37.55

* 1941-1945 incl.: 12.00.

U. S. PRODUCTION OF PRIMARY ALUMINUM

	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	50,045	48,767	53,356	52,023	67,954	76,934	89,895	116,247	128,203
Feb.	47,002	45,699	49,749	50,443	62,740	72,374	92,649	110,483	116,236
Mar.	53,032	51,874	54,852	58,747	70,022	77,068	104,920	122,339	130,272
Apr.	51,007	53,277	54,076	58,024	67,701	76,880	102,071	120,431	126,394
May	51,116	55,450	56,909	61,929	67,720	80,804	105,477	125,144	131,128
June	46,259	48,557	54,184	60,400	67,454	77,476	104,152	120,758	127,633
July	47,998	52,937	55,777	63,518	72,698	78,368	109,285	126,162	132,667
Aug.	47,054	54,953	52,005	63,006	73,816	85,175	110,545	125,296	133,551
Sept.	43,228	53,265	49,742	59,449	69,429	76,882	109,333	120,332	130,606
Oct.	43,959	54,526	45,790	62,916	72,647	77,312	108,219	125,089	134,656
Nov.	43,461	50,714	35,865	62,276	72,246	74,638	105,637	121,252	130,000*
Dec.	47,589	53,474	41,161	65,897	72,454	83,409	110,291	127,035	133,000*
Total	571,750	623,483	603,462	718,622	836,881	937,321	1,252,015	1,458,500	1,554,346*

* Estimate. Source: U. S. Bureau of Mines and Aluminum Association.



ELECTROLYTIC NICKEL

Cents Per Pound, New York, Duty Paid

1929 to Nov. 24, 1946	35.00
Nov. 25, 1946 to Dec. 31, 1947	37.67
Jan. 1, 1948 to July 21, 1948	36.58
July 22, 1948 to Feb. 15, 1949	42.90
Feb. 16, 1949 to Oct. 4, 1949	42.93
Oct. 5, 1949 to May 31, 1950	42.97
June 1, 1950 to Dec. 12, 1950	51.22
Dec. 13, 1950 to June 1, 1951	53.55
June 2, 1951 to Jan. 13, 1953	59.58
Jan. 14, 1953 to Nov. 23, 1954	63.08
Nov. 24, 1954 to Dec. 31, 1955	67.67

ALUMINUM 99 PCT INGOT

Cents Per Pound, Freight Allowed

	1938	1939	1940	1941*	1948*	1949
Jan.	20.00	20.00	20.00	17.00	15.00	17.00
Feb.	20.00	20.00	20.00	17.00	15.00	17.00
Mar.	20.00	20.00	20.00	17.00	15.00	17.00
Apr.	20.00	20.00	19.60	17.00	15.00	17.00
May	20.00	20.00	19.00	17.00	15.00	17.00
June	20.00	20.00	19.00	17.00	15.00	17.00
July	20.00	20.00	19.00	17.00	16.00	17.00
Aug.	20.00	20.00	18.60	17.00	16.00	17.00
Sept.	20.00	20.00	18.00	17.00	16.00	17.00
Oct.	20.00	20.00	18.00	15.00	16.70	17.00
Nov.	20.00	20.00	17.50	15.00	17.00	17.00
Dec.	20.00	20.00	17.00	15.00	17.00	17.00
Average	20.00	20.00	18.71	16.50	15.86	17.00
	1950	1951	1952	1953	1954	1955
Jan.	17.00	19.00	19.00	20.23	21.50	22.83
Feb.	17.00	19.00	19.00	20.50	21.50	23.20
Mar.	17.00	19.00	19.00	20.50	21.50	23.20
Apr.	17.00	19.00	19.00	20.50	21.50	23.20
May	17.20	19.00	19.00	20.50	21.50	23.20
June	17.50	19.00	19.00	20.50	21.50	23.20
July	17.50	19.00	19.00	20.94	21.50	23.20
Aug.	17.50	19.00	20.00	21.50	22.08	24.40
Sept.	17.69	19.00	20.00	21.50	22.28	24.40
Oct.	19.10	19.00	20.00	21.50	22.20	24.40
Nov.	19.00	19.00	20.00	21.50	22.20	24.40
Dec.	19.00	19.00	20.00	21.50	22.20	24.40
Average	17.70	19.00	19.42	20.93	21.78	23.67

* 1942-1947 incl.: 15.00.

Nonferrous

Prices: Lead, magnesium, zinc . . . U.S. primary magnesium production . . . Metal powder prices including iron, zinc, copper.

LEAD PRICE, COMMON GRADE

Cents Per Pound, at New York

	1939	1940	1941†	1948†	1947	1948	1949
Jan.	4.83	5.47	5.50	6.50	13.00	15.00	21.50
Feb.	4.80	5.08	5.60	6.50	13.25	15.00	21.50
Mar.	4.82	5.19	5.77	6.50	15.00	15.00	18.98
Apr.	4.78	5.07	5.85	6.50	15.00	17.21	15.15
May	4.75	5.02	5.85	6.50	15.00	17.50	13.72
June	4.80	5.00	5.85	8.18	15.00	17.50	12.00
July	4.85	5.00	5.85	9.18	15.00	17.80	13.56
Aug.	5.04	4.85	5.85	8.25	15.00	19.50	14.99
Sept.	5.45	4.93	5.85	8.25	15.00	19.50	15.05
Oct.	5.50	5.31	5.85	8.25	15.00	19.50	13.42
Nov.	5.50	5.73	5.85	10.41	15.00	21.50	12.52
Dec.	5.50	5.50	5.85	12.20	15.00	21.50	12.00
Average	5.05	5.18	5.79	8.10	14.69	18.04	15.37

	1950	1951	1952	1953	1954	1955
Jan.	12.00	17.00	19.00	14.19	13.26	15.00
Feb.	12.00	17.00	19.00	13.50	12.82	15.00
Mar.	10.98	17.00	19.00	13.40	12.94	15.00
Apr.	10.63	17.00	18.91	12.64	13.91	15.00
May	11.72	17.00	15.73	12.74	14.00	15.00
June	11.81	17.00	15.08	13.41	14.11	15.00
July	11.86	17.00	16.00	13.68	14.00	14.90
Aug.	12.93	17.00	16.00	14.00	14.06	14.80
Sept.	15.80	17.00	16.00	13.74	14.60	14.94
Oct.	16.00	18.93	14.40	13.50	14.98	15.30
Nov.	17.00	19.00	14.18	13.50	15.00	15.30
Dec.	17.00	19.00	14.13	13.50	*15.00	15.30
Average	13.29	17.49	16.45	13.48	*14.06	15.05

† 1942-1945 incl.: 6.50. * Tentative

AVERAGE COPPER POWDER PRICE

Cents per lb, F.O.B. Mill—100 Mesh

	Electrolytic	Reduced
1950 Average	31.25	31.43
1951 Average	35.17	34.50
1952 Average	35.25	34.50
1953 Average	41.49	41.14
1954 Average	43.50	43.50
1955 Average	53.37	53.37

AVERAGE ZINC POWDER PRICE

Cents per lb, F.O.B. Mill—100 Mesh

1948 Average	15.41 to 18.71
1950 Average	20.50 to 23.85
1951 Average	22.54 to 29.25
1952 Average	23.0 to 30.5
1953 Average	17.36 to 24.86
1954 Average	17.50 to 25.00
1955 Average	18.50 to 32.25

IMPORTS OF IRON POWDER Net Tons

1948	2,590
1949	3,108
1950	7,607
1951	12,850
1952	5,627
1953	6,964
1954	9,835

COPPER POWDER SHIPMENTS Net Ton

	Total	Bearings and Parts	Friction Materials	Graphite Metal Brushes	Miscellaneous
1945	6,550	.....	560	330	590
1946	7,380	5,900	560	330	590
1947	8,700	7,170	615	385	600
1948	8,560	6,560	675	575	770
1949	7,014	4,374	1,158	450	1,032
1950	13,109	9,488	1,271	957	1,393
1951	13,571	11,013	963	390	1,205
1952	8,979	6,731	1,081	262	905
1953	11,515	9,281	859	430	944
1954	9,675	7,450	770	510	945
1955	11,695	8,065	1,490	900	1,440

* Estimate.

IRON POWDER, AVERAGE MONTHLY PRICES

Cents Per Pound, F.O.B. Mill Unless Otherwise Specified

	Swedish Sponge, c.i.f. N. Y., Ocean Bags, −100 Mesh	Domestic Sponge, 98+Pct Fe, Carload Lots, −100 Mesh	Electrolytic, Annealed, 99.5+Pct Fe, −100 Mesh	Electrolytic, Unannealed, −325 Mesh 99+Pct Fe	Hydrogen Reduced, −300 Mesh 98+Pct Fe	Carbonyl, 5-10 Microns, 98=99.8+ Pct Fe
1950 Aver.	7.4 to 9.0	9.0 to 15.0	38.0 to 39.5	48.5	63.0 to 80.0	70.0 to 135.0
1951 Aver.	7.4 to 9.0	12.65 to 16.16	40.45	51.48	63.0 to 80.0	80.84 to 146.0
1952 Aver.	8.57 to 9.79	15.5 to 17.0	43.1	56.2	63.0 to 80.0	83.0 to 148.0
1953 Aver.	11.5	16.98	44.0	60.00	63.0 to 80.0	83.0 to 148.0
1954 Aver.	11.25	16.35	40.75	56.48	63.0 to 80.0	83.0 to 148.0
1955 Aver.	10.37	9.5	36.5	58.2	55.0 to 85.0	86.0 to 155.0

U.S. PRODUCTION OF PRIMARY MAGNESIUM

Short Tons, Excludes Crystal Equivalent of Mg Content of Fire Bombs in 1943, 1944

Month	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
January	20,056	3,816	98	1,398	883	988	1,002	1,876	7,425	9,908	6,446	5,089
February	19,537	2,958	48	1,232	830	884	913	1,709	7,794	9,078	5,856	4,646
March	19,571	3,297	10	1,472	887	988	948	1,885	8,893	10,352	6,545	4,942
April	17,986	3,174	.....	1,153	801	958	957	2,043	8,800	9,751	6,203	1,859
May	16,217	3,171	.....	926	797	987	972	2,194	9,093	9,116	6,460	4,277
June	13,750	3,404	241	848	766	950	1,175	2,512	8,670	7,286	6,190	4,757
July	14,134	4,586	692	905	792	985	1,132	2,998	9,529	6,207	6,049	5,112
August	11,561	4,500	889	849	809	970	1,400	3,418	9,771	6,265	5,771	5,880
September	8,296	2,063	986	886	819	974	1,635	4,166	8,422	6,076	5,325	5,923
October	7,370	1,017	1,000	912	873	941	1,690	5,147	8,990	6,341	5,149	6,286
November	5,301	715	558	870	814	969	1,760	6,043	9,123	6,227	4,942	6,300*
December	3,321	161	795	893	932	1,004	1,942	6,923	9,323	6,467	4,788	6,300*
Total	157,100	32,792	5,317	12,344	10,003	11,598	15,726	40,914	105,833	93,075	69,724	61,371*

Producers' reports to WPB, Jan. 1942 to Aug. 1945, thereafter to Bureau of Mines and Magnesium Assn.
* Estimate.

Nonferrous market reports and price quotations are a weekly Iron Age feature. "Review and Forecast," p. 140 also reports on nonferrous metals.

SHIPMENTS OF IRON POWDER

Total Net Tons, Four Major Classes*

	Total	Bearings and Parts	Friction Materials	Magnetic Cores	Miscellaneous
1944	1,720	.....	.....	.....	.....
1945	1,950	.....	.....	.....	.....
1946	2,485	1,350	30	415	690
1947	3,115	1,560	30	600	845
1948	3,520	1,685	25	990	820
1949	3,235	1,746	14	935	540
1950	3,942	1,570	23	1,811	738
1951	3,651	2,150	1.5	900	600
1952	4,048	2,109	1.0	336	1,602
1953	6,255	3,457	14.4	1,589	1,189
1954	7,835	3,445	75.0	905	3,410
1955	20,420 †	9,600 †	120.0 †	1,100 †	9,600 †

* Domestic. † Estimates.

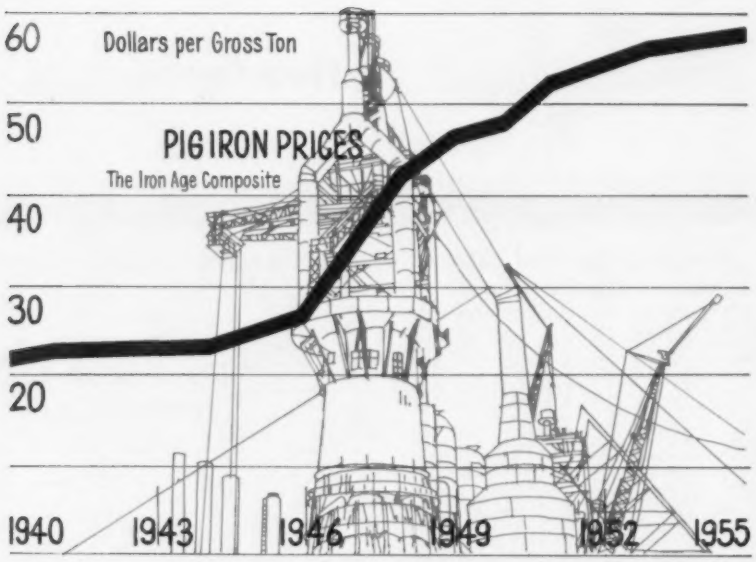
PRIME WESTERN ZINC PRICE Cents Per Pound, at New York

	1939	1940	1941†	1946†	1947	1948	1949
Jan.	4.89	6.03	7.65	8.85	11.005	11.69	18.18
Feb.	4.89	5.93	7.65	8.65	11.005	12.61	18.20
Mar.	4.89	6.14	7.65	8.66	11.005	12.61	17.76
Apr.	4.89	6.14	7.65	8.65	11.005	12.61	14.76
May	4.89	6.20	7.65	8.65	11.005	12.64	12.58
June	4.89	6.63	7.65	8.65	11.005	12.65	10.27
July	4.91	6.54	7.65	8.69	11.005	13.09	10.06
Aug.	5.11	6.79	7.65	8.69	11.005	15.65	10.70
Sept.	6.51	7.33	7.65	8.69	11.005	15.65	10.77
Oct.	6.89	7.65	8.36	9.28	11.03	15.74	10.04
Nov.	6.89	7.64	8.65	10.86	11.06	17.27	10.46
Dec.	6.46	7.65	8.85	10.94	11.06	18.15	10.47
Average	5.51	6.73	7.8	9.09	11.02	14.20	12.85

	1950	1951	1952	1953	1954	1955
Jan.	9.48	18.22	20.29	13.43	10.26	12.00
Feb.	10.47	18.22	20.29	12.31	9.88	12.00
Mar.	10.66	18.22	20.29	11.86	10.16	12.00
Apr.	11.41	18.25	20.29	11.83	10.75	12.43
May	12.71	18.25	20.33	11.83	10.79	12.50
June	15.49	18.25	16.57	11.83	11.46	12.75
July	15.72	18.25	15.83	11.67	11.50	13.00
Aug.	15.72	18.26	14.88	11.53	11.50	13.00
Sept.	17.82	18.29	14.86	10.68	11.98	13.40
Oct.	18.22	20.22	14.08	10.50	12.00	13.50
Nov.	18.22	20.29	13.33	10.50	12.00	13.50
Dec.	18.22	20.29	13.33	10.50	*12.00	13.50
Average	14.51	18.75	17.03	11.54	*11.19	12.79

† 1942-1945, incl.: 8.65. * Tentative

Pig Iron and Iron Ore



COMPOSITE PIG IRON PRICE

Average of THE IRON AGE quotations on basic pig iron at Valley furnaces and foundry iron at Chicago, Birmingham, Buffalo, Valley and Philadelphia, in gross tons.

	1934	1936	1937	1938	1939	1940
Jan.	$16.90	$18.84	$20.25	$23.25	$20.61	$22.61
Feb.	16.90	18.84	20.50	23.25	20.61	22.61
Mar.	16.90	18.84	22.85	23.25	20.61	22.61
Apr.	17.07	18.84	23.25	23.25	20.61	22.61
May	17.90	18.84	23.25	23.25	20.61	22.61
June	17.90	18.84	23.25	22.98	20.61	22.61
July	17.90	18.84	23.25	19.61	20.61	22.61
Aug.	17.90	18.73	23.25	19.61	20.61	22.61
Sept.	17.90	18.73	23.25	19.82	21.61	22.61
Oct.	17.90	18.73	23.25	20.57	22.61	22.61
Nov.	17.90	18.98	23.25	20.61	22.61	22.61
Dec.	17.90	19.73	23.25	20.61	22.61	22.95
Average	17.58	18.90	22.74	21.67	21.19	22.64

	1941*	1945*	1946	1947	1948	1949
Jan.	$23.45	$23.61	$25.37	$30.14	$39.83	$46.79
Feb.	23.45	24.11	25.37	30.15	40.27	46.74
Mar.	23.53	24.61	25.75	32.92	40.32	46.74
Apr.	23.61	24.61	26.12	33.15	40.11	46.64
May	23.61	24.61	26.45	33.15	40.33	45.97
June	23.61	24.61	28.13	33.15	40.51	45.91
July	23.61	24.61	28.13	34.52	42.25	45.91
Aug.	23.61	24.61	28.13	36.84	44.34	45.91
Sept.	23.61	24.61	28.13	36.95	44.96	45.90
Oct.	23.61	24.91	28.13	36.95	46.63	45.88
Nov.	23.61	25.37	28.13	37.04	48.84	45.88
Dec.	23.61	25.37	29.64	37.24	48.91	45.88
Average	23.58	24.81	27.29	34.35	42.94	46.18

	1950	1951	1952	1953	1954	1955
Jan.	$45.98	$52.69	$52.72	$55.26	$56.59	$56.59
Feb.	46.38	52.69	52.72	55.26	56.59	56.59
Mar.	46.38	52.69	52.72	55.26	56.59	56.59
Apr.	46.38	52.69	52.72	55.26	56.59	56.59
May	46.38	52.69	52.77	55.26	56.59	56.59
June	46.38	52.69	52.77	55.32	56.59	56.59
July	46.38	52.69	53.27	56.73	56.59	56.46
Aug.	46.56	52.69	55.26	56.76	56.59	59.09
Sept.	47.16	52.69	55.26	56.66	56.59	59.09
Oct.	49.29	52.72	55.26	56.59	56.59	59.09
Nov.	49.69	52.72	55.26	56.59	56.59	59.09
Dec.	52.50	52.72	55.26	56.59	56.59	59.09
Average	47.85	52.70	53.83	55.96	56.59	57.78

* Price unchanged at $23.61 from 1942 through 1944.

PRODUCTION OF PIG IRON AND FERROALLOYS, Net Tons

	PIG IRON								FERROALLOYS*			
Years	Basic	Bessemer	Low Phosphorus	Foundry	Malleable	Forge	All Other, Including Direct Castings	Total Pig Iron	Ferromang. and Spiegeleisen	Ferrosilicon and Silvery Pig Iron	All Other Ferroalloys	Total Ferroalloys
1955†	.....	.....	.....	.....	.....	.....	.....	77,400,000	.....	.....	.....	2,400,000
1954	47,023,175	5,652,503	211,893	2,273,032	2,629,062	.....	202,283	57,965,548	749,413	636,694	454,587	1,840,694
1953	59,882,512	8,110,881	297,065	2,500,996	3,784,458	.....	325,517	74,901,429	1,007,248	772,339	569,152	2,348,739
1952	47,511,189	7,445,715	307,478	2,670,210	3,120,168	.....	258,178	61,312,938	820,808	749,059	471,150	2,041,017
1951	54,212,509	9,045,954	314,725	3,050,626	3,363,369	.....	287,095	70,274,278	865,805	919,065	389,375	2,174,265
1950	49,860,440	8,090,608	335,418	2,806,247	3,181,043	.....	293,151	64,586,907	776,881	839,667	196,856	1,813,404
1949	40,905,356	7,059,416	301,520	2,503,912	2,409,436	.....	232,922	53,412,562	675,029	687,322	161,872	1,504,223
1948	46,315,064	7,731,530	384,425	2,769,510	2,590,656	.....	264,031	60,055,216	805,013	842,385	208,945	1,856,343
1947	44,804,743	7,182,207	331,118	2,953,405	2,874,752	.....	182,687	58,328,912	800,725	802,976	184,706	1,788,407
1946	33,727,655	5,932,414	167,013	2,545,936	2,190,285	.....	215,493	44,778,796	540,061	724,141	156,828	1,421,030
1945	39,866,982	8,255,513	314,063	2,248,887	2,350,076	.....	187,648	53,223,169	706,078	817,849	171,933	1,695,860
1944	45,886,008	9,756,836	474,686	2,190,681	2,494,669	.....	204,569	61,007,439	809,638	837,944	211,177	1,858,759
1943	45,374,662	10,258,788	538,832	2,059,501	2,393,241	.....	185,646	60,810,670	803,623	923,480	232,204	1,959,277
1942	43,532,885	9,865,220	562,672	2,546,530	2,399,520	.....	169,137	59,075,944	785,103	880,843	161,414	1,827,360
1941	39,750,841	9,522,343	474,428	2,780,827	2,417,137	1,074	164,901	55,100,551	730,009	729,716	126,328	1,586,053

Including ferroalloys produced in electric furnaces

† Iron Age Estimate.

Source: American Iron and Steel Institute.

CANADIAN BLAST FURNACE PRODUCTION, Net Tons Including Ferroalloys

Year	Pig Iron	Ferroalloys	Total	Year	Pig Iron	Ferroalloys	Total	Year	Pig Iron	Ferroalloys	Total
1932	161,425	18,100	179,525	1940	1,309,161	151,661	1,460,822	1948	2,120,909	250,659	2,371,568
1933	254,592	33,737	288,329	1941	1,528,054	213,218	1,741,272	1949	2,154,352	211,603	2,365,955
1934	455,789	37,055	492,844	1942	1,975,015	213,636	2,188,651	1950	2,309,732	181,575	2,491,307
1935	678,302	61,182	740,484	1943	1,758,265	216,687	1,852,626	1951	2,652,696	250,930	2,903,626
1936	759,618	87,679	847,297	1944	1,652,626	182,426	4,012,008	1952	2,682,065	232,036	2,914,101
1937	1,006,717	91,931	1,098,648	1945	1,777,956	186,978	1,964,936	1953	3,012,289	150,595	3,162,864
1938	789,710	59,720	849,430	1946	1,403,756	116,995	1,520,753	1954	2,213,433	109,833	2,323,266
1939	846,418	85,531	931,949	1947	1,969,847	149,832	2,119,679	1955*	3,234,300	125,000	3,359,300

* Estimated.

Source: Dominion Bureau of Statistics

Pig Iron

Prices: Foundry iron at Buffalo, Chicago, Granite City, Valley and Birmingham . . . basic iron Valley . . . Valley malleable.

CHICAGO FOUNDRY PIG IRON

Per Gross Ton, at Furnace

	1940*	1945*	1946	1947	1948	1949
Jan.	$23.00	$24.00	$25.75	$30.50	$38.75	$46.50
Feb.	23.00	24.50	25.75	30.50	39.00	46.50
Mar.	23.00	25.00	26.13	33.00	39.00	46.50
Apr.	23.00	25.00	26.50	33.00	39.00	46.50
May	23.00	25.00	26.50	33.00	39.00	46.50
June	23.00	25.00	28.50	33.00	39.00	46.50
July	23.00	25.00	28.50	34.20	42.00	46.50
Aug.	23.00	25.00	28.50	36.00	39.00	46.50
Sept.	23.00	25.00	28.50	36.00	43.00	46.50
Oct.	23.00	25.30	28.50	36.00	46.50	46.50
Nov.	23.00	25.75	28.50	36.00	46.50	46.50
Dec.	23.40	25.75	30.10	36.40	46.50	46.50
Average	23.03	25.02	27.64	34.80	41.77	46.50

	1950	1951	1952	1953	1954	1955
Jan.	$46.50	$52.50	$52.50	$55.00	$56.50	$56.50
Feb.	46.50	52.50	52.50	55.00	56.50	56.50
Mar.	46.50	52.50	52.50	55.00	56.50	56.50
Apr.	46.50	52.50	52.50	55.00	56.50	56.50
May	46.50	52.50	52.50	55.00	56.50	56.50
June	46.50	52.50	52.50	55.00	56.50	56.50
July	46.50	52.50	53.00	56.50	56.50	58.37
Aug.	46.50	52.50	55.00	56.50	56.50	59.00
Sept.	47.50	52.50	55.00	56.50	56.50	59.00
Oct.	49.50	52.50	55.00	56.50	56.50	59.00
Nov.	49.50	52.50	55.00	56.50	56.50	59.00
Dec.	52.50	52.50	55.00	56.50	56.50	59.00
Average	47.58	52.50	53.75	55.75	56.50	57.69

* Price unchanged at $24.00 from 1941 through 1944.

BUFFALO FOUNDRY PIG IRON

Per Gross Ton, at Furnace

	1940*	1945*	1946	1947	1948	1949
Jan.	$23.00	$24.00	$25.75	$30.50	$40.37	$47.28
Feb.	23.00	24.50	25.75	30.50	42.12	47.00
Mar.	23.00	25.00	26.13	32.38	42.45	47.00
Apr.	23.00	25.00	26.50	33.00	41.49	46.75
May	23.00	25.00	26.50	33.00	41.37	46.50
June	23.00	25.00	26.50	33.00	41.44	46.50
July	23.00	25.00	28.50	34.20	42.08	46.50
Aug.	23.00	25.00	28.50	37.37	44.90	46.50
Sept.	23.00	25.00	28.50	37.18	45.87	46.50
Oct.	23.00	25.30	28.50	37.00	47.12	46.50
Nov.	23.00	25.75	28.50	37.75	47.50	46.50
Dec.	23.40	25.75	30.10	38.00	47.50	46.50
Average	23.03	25.02	27.64	34.49	43.65	46.87

	1950	1951	1952	1953	1954	1955
Jan.	$46.50	$52.50	$52.50	$55.00	$56.50	$56.50
Feb.	46.50	52.50	52.50	55.00	56.50	56.50
Mar.	46.50	52.50	52.50	55.00	56.50	56.50
Apr.	46.50	52.50	52.50	55.00	56.50	56.50
May	46.50	52.50	52.50	55.00	56.50	56.50
June	46.50	52.50	52.50	55.00	56.50	56.50
July	46.50	52.50	53.00	56.50	56.50	58.37
Aug.	46.50	52.50	55.00	56.50	56.50	59.00
Sept.	47.25	52.50	55.00	56.50	56.50	59.00
Oct.	49.50	52.50	55.00	56.50	56.50	59.00
Nov.	49.50	52.50	55.00	56.50	56.50	59.00
Dec.	52.50	52.50	55.00	56.50	56.50	59.00
Average	47.58	52.50	53.75	55.75	56.50	57.69

* Price unchanged at $24.00 from 1941 through 1944.

FOUNDRY PIG IRON PRICES

Mahoning, Shenango Valley, Per Gross Ton

	1939	1940*	1945*	1946	1947	1948†
Jan.	$21.00	$23.00	$24.00	$25.75	$30.50	$38.37
Feb.	21.00	23.00	24.50	25.75	30.50	39.50
Mar.	21.00	23.00	25.00	26.13	33.50	39.50
Apr.	21.00	23.00	25.00	26.50	33.50	39.50
May	21.00	23.00	25.00	26.50	33.50	39.50
June	21.00	23.00	25.00	28.50	33.50	39.50
July	21.00	23.00	25.00	28.50	34.70	42.50
Aug.	21.00	23.00	25.00	28.50	36.50	43.50
Sept.	22.00	23.00	25.00	28.50	36.50	43.50
Oct.	23.00	23.00	25.30	28.50	36.50	46.12
Nov.	23.00	23.00	25.75	28.50	36.50	46.50
Dec.	23.00	23.40	25.75	30.10	36.70	46.50
Average	21.59	23.03	25.02	27.64	34.36	42.12

	1950	1951	1952	1953	1954	1955
Jan.	$46.50	$52.50	$52.50	$55.00	$56.50	$56.50
Feb.	46.50	52.50	52.50	55.00	56.50	56.50
Mar.	46.50	52.50	52.50	55.00	56.50	56.50
Apr.	46.50	52.50	52.50	55.00	56.50	56.50
May	46.50	52.50	52.50	55.00	56.50	56.50
June	46.50	52.50	52.50	55.00	56.50	56.50
July	46.50	52.50	53.00	56.50	56.50	58.37
Aug.	46.50	52.50	55.00	56.50	56.50	59.00
Sept.	47.50	52.50	55.00	56.50	56.50	59.00
Oct.	49.50	52.50	55.00	56.50	56.50	59.00
Nov.	49.50	52.50	55.00	56.50	56.50	59.00
Dec.	52.12	52.50	55.00	56.50	56.50	59.00
Average	47.55	52.50	53.75	55.75	56.50	57.69

* Price unchanged at $24.00 from 1941 through 1944.
† Price unchanged at $46.50 through 1949.

GRANITE CITY, ILL., PIG IRON

Foundry, Gross Ton, at Furnace

	1940*	1945*	1946	1947	1948	1949
Jan.	$23.00	$24.00	$25.75	$30.50	$39.25	$48.40
Feb.	23.00	24.50	25.75	30.50	40.00	48.40
Mar.	23.00	25.00	26.13	32.00	40.00	48.40
Apr.	23.00	25.00	26.50	33.50	40.00	48.40
May	23.50	25.00	26.50	33.50	41.43	48.40
June	23.00	25.00	28.50	33.50	45.75	48.40
July	23.00	25.00	28.50	34.80	45.75	48.40
Aug.	23.00	25.00	28.50	36.63	47.34	48.40
Sept.	23.00	25.00	28.50	37.00	48.40	48.40
Oct.	23.00	25.30	28.50	37.00	48.40	48.40
Nov.	23.00	25.75	28.50	37.00	48.40	48.40
Dec.	23.50	25.75	29.70	37.00	48.40	48.40
Average	23.04	25.02	27.44	34.39	44.42	48.40

	1950	1951	1952	1953	1954	1955
Jan.	$48.40	$54.40	$54.40	$56.90	$58.40	$58.40
Feb.	48.40	54.40	54.40	56.90	58.40	58.40
Mar.	48.40	54.40	54.40	56.90	58.40	58.40
Apr.	48.40	54.40	54.40	56.90	58.40	58.40
May	48.40	54.40	54.40	56.90	58.40	58.40
June	48.40	54.40	54.40	56.90	58.40	58.40
July	48.40	54.40	54.90	58.40	58.40	60.27
Aug.	48.40	54.40	56.90	58.40	58.40	60.90
Sept.	48.40	54.40	56.90	58.40	58.40	60.90
Oct.	51.40	54.40	56.90	58.40	58.40	60.90
Nov.	51.40	54.40	56.90	58.40	58.40	60.90
Dec.	53.85	54.40	56.90	58.40	58.40	60.90
Average	49.34	54.40	55.48	57.65	58.40	59.59

* Price unchanged at $24.00 from 1941 through 1944.

BIRMINGHAM PIG IRON PRICES

Foundry Grade, Per Gross Ton

	1941†	1945†	1946	1947	1948	1949
Jan.	$19.38	$20.38	$22.13	$22.13	$37.38	$43.38
Feb.	19.38	20.88	22.13	26.88	37.38	43.38
Mar.	19.89	21.38	22.51	29.13	37.38	43.38
Apr.	20.38	21.38	22.88	29.88	37.38	43.38
May	20.38	21.38	22.88	29.88	38.38	38.71
June	20.38	21.38	24.88	29.88	39.38	39.38
July	20.38	21.38	24.88	31.28	31.04	39.38
Aug.	20.38	21.38	24.88	34.13	43.38	39.38
Sept.	20.38	21.38	24.88	34.88	43.38	39.38
Oct.	20.38	21.68	24.88	34.88	43.38	39.38
Nov.	20.38	22.13	24.88	34.88	43.38	39.38
Dec.	20.38	22.13	26.88	34.60	43.38	39.38
Average	20.17	21.40	24.06	31.43	40.43	40.74

	1950	1951	1952	1953	1954	1955
Jan.	$39.38	$48.88	$48.88	$51.38	$52.88	$52.88
Feb.	42.38	48.88	48.88	51.38	52.88	52.88
Mar.	42.38	48.88	48.88	51.38	52.88	52.88
Apr.	42.38	48.88	48.88	51.38	52.88	52.88
May	42.38	48.88	48.88	51.38	52.88	52.88
June	42.38	48.88	48.88	51.38	52.88	52.88
July	42.38	48.88	49.38	52.88	52.88	54.47
Aug.	42.38	48.88	51.38	52.88	52.88	55.00
Sept.	42.67	48.88	51.38	52.88	52.88	55.00
Oct.	45.88	48.88	51.38	52.88	52.88	55.00
Nov.	45.88	48.88	51.38	52.88	52.88	55.00
Dec.	48.88	48.88	51.38	52.88	52.88	55.00
Average	43.53	48.88	49.96	52.13	52.88	53.89

* Price unchanged at $19.38 through 1940.
† Price unchanged at $20.38 from 1942 through 1944.

BASIC PIG IRON, VALLEY

Mahoning, Shenango Valley, Gross Ton

	1939	1940*	1945*	1946	1947	1948†
Jan.	$20.50	$22.50	$23.50	$25.25	$30.00	$38.87
Feb.	20.50	22.50	24.00	25.25	30.00	39.00
Mar.	20.50	22.50	24.50	25.63	33.00	39.00
Apr.	20.50	22.50	24.50	26.00	33.00	39.00
May	20.50	22.50	24.50	26.00	33.00	39.00
June	20.50	22.50	24.50	28.00	33.00	39.00
July	20.50	22.50	24.50	28.00	34.20	42.00
Aug.	20.50	22.50	24.50	28.00	38.00	43.00
Sept.	21.50	22.50	24.50	28.00	38.00	43.00
Oct.	22.50	22.50	24.80	28.00	38.00	45.62
Nov.	22.50	22.50	25.25	28.00	38.00	46.00
Dec.	22.50	22.90	25.25	28.00	38.20	46.00
Average	21.09	22.53	24.52	27.14	34.78	41.62

	1950	1951	1952	1953	1954	1955
Jan.	$46.00	$52.00	$52.00	$54.50	$56.00	$56.00
Feb.	46.00	52.00	52.00	54.50	56.00	56.00
Mar.	46.00	52.00	52.00	54.50	56.00	56.00
Apr.	46.00	52.00	52.00	54.50	56.00	56.00
May	46.00	52.00	52.00	54.50	56.00	56.00
June	46.00	52.00	52.00	54.50	56.00	56.00
July	46.00	52.00	52.50	56.00	56.00	57.87
Aug.	46.00	52.00	54.50	56.00	56.00	58.50
Sept.	46.75	52.00	54.50	56.00	56.00	58.50
Oct.	49.00	52.00	54.50	56.00	56.00	58.50
Nov.	49.00	52.00	54.50	56.00	56.00	58.50
Dec.	51.62	52.00	54.50	56.00	56.00	58.50
Average	47.03	52.00	53.08	55.25	56.00	57.19

* Price unchanged at $23.50 from 1941 through 1944.
† Price unchanged at $46.00 through 1949.

MALLEABLE PIG IRON PRICES, Per Gross Ton, Mahoning, Shenango Valley

	1939	1940*	1945*	1946	1947	1948†
Jan.	$21.00	$23.00	$24.00	$25.75	$30.50	$39.50
Feb.	21.00	23.00	24.50	25.75	30.50	39.50
Mar.	21.00	23.00	25.00	26.13	33.50	39.50
Apr.	21.00	23.00	25.00	26.50	33.50	39.50
May	21.00	23.00	25.00	26.50	33.50	39.50
June	21.00	23.00	25.00	28.50	33.50	39.50
July	21.00	23.00	25.00	28.50	34.70	42.50
Aug.	21.00	23.00	25.00	28.50	36.50	43.50
Sept.	22.00	23.00	25.00	28.50	36.50	43.50
Oct.	23.00	23.00	25.30	28.50	36.50	46.12
Nov.	23.00	23.00	25.75	28.50	36.50	46.50
Dec.	23.00	23.50	25.75	30.10	36.70	46.50
Average	21.59	23.04	25.02	27.48	34.36	42.13

	1950	1951	1952	1953	1954	1955
Jan.	$46.50	$52.50	$52.50	$55.00	$56.50	$56.50
Feb.	46.50	52.50	52.50	55.00	56.50	56.50
Mar.	46.50	52.50	52.50	55.00	56.50	56.50
Apr.	46.50	52.50	52.50	55.00	56.50	56.50
May	46.50	52.50	52.50	55.00	56.50	56.50
June	46.50	52.50	52.53	55.00	56.50	56.50
July	46.50	52.50	53.00	56.50	56.50	56.87
Aug.	46.50	52.50	55.00	56.50	56.50	59.00
Sept.	47.50	52.50	55.00	56.50	56.50	59.00
Oct.	49.50	52.50	55.00	56.50	56.50	59.00
Nov.	49.50	52.50	55.00	56.50	56.50	59.00
Dec.	52.50	52.50	55.00	56.50	56.50	59.00
Average	47.58	52.50	53.75	55.75	56.50	57.57

* Price unchanged at $24.00 from 1941 through 1944. † Price unchanged at $46.50 through 1949.

The business outlook for '56 plus top metalworking developments and trends are summed up in a special section starting on p. 136. Automotive review and forecast starts on p. 184. For the machine tool outlook for 1956 turn to p. 195.

Iron Ore

Prices: Lake Superior ore, foundry and furnace coke . . . Iron ore analyses, ore shipments and prices for various grades.

LAKE SUPERIOR IRON ORES

Avge. Analyses, Combined Ranges, Grades

Year	Analyses, Pct				
	Iron, Natural	Phos.	Silica	Mang.	Moisture
1954	50.66	0.85	10.22	0.70	10.47
1953	50.39	0.90	10.25	0.75	10.90
1952	50.49	0.111	10.05	0.77	10.78
1951	50.25	0.090	9.67	0.77	11.22
1950	50.38	0.092	9.85	0.77	11.11
1949	50.39	0.096	9.72	0.78	11.12
1948	50.49	0.093	9.30	0.76	11.35
1947	50.91	0.093	9.09	0.75	11.28
1946	51.32	0.087	8.63	0.74	11.22
1945	51.69	0.089	8.52	0.72	10.96
1944	51.72	0.088	8.42	0.74	11.02
1943	51.58	0.091	8.32	0.82	11.06
†1942	51.65	0.089	8.21	0.79	10.98
†1941	51.83	0.085	8.18	0.78	11.01
†1940	52.09	0.085	8.00	0.77	10.93
†1939	51.75	0.085	8.27	0.76	10.73
1938	51.90	0.089	8.25	0.81	10.13

Source: Lake Superior Iron Ore Assn.

SHIPMENTS OF IRON ORE

Lake Superior Shipments, Gross Tons

1937	61,973,000
1938	19,353,000
1939	44,984,000
1940	63,308,000
1941	79,941,000
1942	92,070,000
1943	85,116,000
1944	81,039,000
1945	75,207,000
1946	58,975,000
1947	77,210,278
1948	82,655,757
1949	69,556,269
1950	78,205,892
1951	89,092,012
1952	74,910,798
1953	95,844,449
1954	60,793,697
1955	87,160,224†

† Estimate.

Source: Lake Superior Iron Ore Assn.

U. S. IRON ORE CONSUMPTION

In Long Tons

1945	85,158,495
1946	72,174,844
1947	96,115,549
1948	100,498,557
1949	91,123,220
1950	106,610,273
1951	114,837,112
1952	100,640,636
1953	122,124,661
1954	98,800,000
1955*	128,000,000

* Estimate by The Iron Age.

Source: U. S. Bureau of Mines.

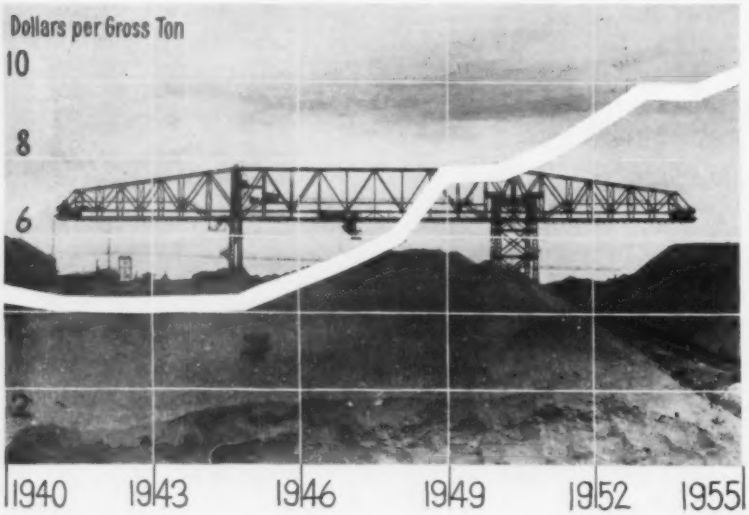
LAKE SUPERIOR IRON ORE PRICES

Per Gross Ton at Lower Lake Ports

BESSEMER ORES	Guarantee		Price	
	Iron Natural	Phosphorus Dry	Old Range	Mesabi
1929 through 1936	51.50	0.045	4.80	4.65
1937 to Apr. 15, 1940	51.50	0.045	5.25	5.10
1940-Apr. 16 on	51.50	0.045	4.75	4.60
1941 through 1944	51.50	0.045	4.75	4.60
1945 to June 24, 1946	51.50	0.045	4.95	4.70
1946-June 24 to Dec. 31	51.50	0.045	5.45	5.20
1947 to Apr. 1, 1948	51.50	0.045	5.95	5.70
1948-Apr. 1 on	51.50	0.045	6.60	6.35
1949	51.50	0.045	7.60	7.35
1950-Feb. 1 to Dec. 1	51.50	0.045	8.10	7.85
1950-Dec. 1 on	51.50	0.045	8.70	8.45
1951	51.50	0.045	8.70	8.45
1952 to July 25	51.50	0.045	8.70	8.45
1952-July 26 on	51.50	0.045	9.45	9.20
1953 to June 30	51.50	0.045	10.10	9.85
1953-July 1 on	51.50	0.045	10.30	10.05
1954	51.50	0.045	10.30	10.05
1955	51.50	0.045	10.40	10.25

NON-BESSEMER	Guarantee	Price		
	Iron Natural	Old Range	Mesabi	High Phosphorus
1929 through 1936	51.50	4.65	4.50	4.40
1937 to Apr. 15, 1940	51.50	5.10	4.95	4.85
1940-Apr. 16 on	51.50	4.60	4.45	4.35
1941 through 1944	51.50	4.60	4.45	4.35
1945 to June 24, 1946	51.50	4.80	4.55	4.55
1946-June 24 to Dec. 31	51.50	5.30	5.05	5.05
1947 to Apr. 1, 1948	51.50	5.80	5.55	5.55
1948-Apr. 1 on	51.50	6.45	6.20	6.20
1949	51.50	7.45	7.20	7.20
1950-Feb. 1 to Dec. 1	51.50	7.95	7.70	7.70
1950-Dec. 1 on	51.50	8.55	8.30	8.30
1951	51.50	8.55	8.30	8.30
1952 to July 25	51.50	8.55	8.30	8.30
1952-July 26 on	51.50	9.30	9.05	9.05
1953 to June 30	51.50	9.95	9.70	9.70
1953-July 1 on	51.50	10.15	9.90	9.90
1954	51.50	10.15	9.90	9.90
1955	51.50	10.25	10.10	10.00

IRON ORE MESABI NON-BESSEMER



CONNELLSVILLE FOUNDRY COKE

Net Ton at Oven, Monthly Review

	1944	1945	1946	1947	1948	1949
Jan.	$8.06	$8.25	$9.00	$8.50	$14.00	$16.94
Feb.	8.25	8.25	9.00	9.35	14.00	16.75
Mar.	8.25	8.25	9.00	10.28	14.00	16.50
Apr.	8.25	8.25	9.00	10.65	14.00	16.50
May	8.25	8.47	9.00	11.25	14.00	16.38
June	8.25	9.00	9.00	11.25	16.00	16.25
July	8.25	9.00	9.68	12.75	16.50	16.13
Aug.	8.25	9.00	8.50	13.75	17.00	15.75
Sept.	8.25	9.00	8.50	13.75	17.00	15.75
Oct.	8.25	9.00	8.50	13.94	17.00	15.75
Nov.	8.25	9.00	8.50	14.00	17.00	15.75
Dec.	8.25	9.00	8.50	14.00	17.00	15.75
Average	8.24	8.71	8.85	11.96	15.62	16.18

	1950	1951	1952	1953	1954	1955
Jan.	$15.75	$17.25	$17.75	$17.75	$16.75	$16.75
Feb.	15.75	17.25	17.75	17.75	16.75	16.75
Mar.	16.25	17.50	17.75	17.63	16.75	16.75
Apr.	15.25	17.75	17.75	17.25	16.75	16.75
May	16.25	17.75	17.75	17.25	16.75	16.35
June	16.25	17.75	17.75	17.25	16.75	16.25
July	16.25	17.75	17.75	17.25	16.75	16.25
Aug.	16.25	17.75	17.75	17.25	16.75	16.25
Sept.	16.25	17.75	17.75	16.95	16.75	16.25
Oct.	16.75	17.75	17.75	16.75	16.75	16.25
Nov.	16.75	17.75	17.75	16.75	16.75	16.25
Dec.	17.12	17.75	17.75	16.75	16.75	16.25
Average	16.32	17.65	17.75	17.22	16.75	16.42

* Price unchanged at $8.88 throughout 1942.

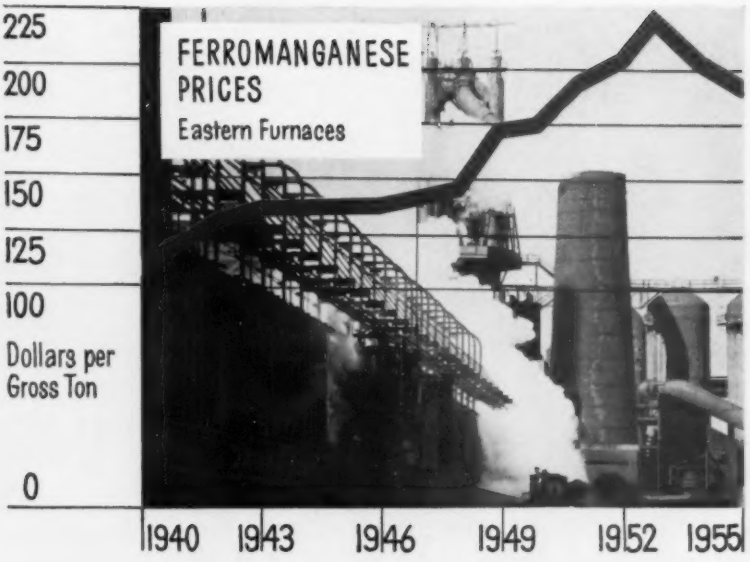
CONNELLSVILLE FURNACE COKE

Net Ton at Oven, Monthly Review

	1943*	1945*	1946	1947	1948	1949
Jan.	$6.00	$7.00	$7.50	$8.75	$12.50	$16.56
Feb.	6.25	7.00	7.50	8.68	12.50	15.25
Mar.	6.50	7.00	7.50	9.00	12.50	14.50
Apr.	6.50	7.00	7.50	9.60	12.50	14.50
May	6.00	7.15	7.50	10.50	12.50	14.38
June	6.50	7.50	7.50	10.50	12.70	14.25
July	6.50	7.50	8.50	11.40	13.68	14.25
Aug.	6.50	7.50	8.75	12.00	14.75	14.25
Sept.	6.50	7.50	8.75	12.00	15.00	14.25
Oct.	6.50	7.50	8.75	12.38	15.00	14.25
Nov.	6.50	7.50	8.75	12.50	15.00	14.20
Dec.	6.50	7.50	8.75	12.50	15.00	14.00
Average	6.45	7.30	8.10	10.83	13.63	14.58

	1950	1951	1952	1953	1954	1955
Jan.	$14.00	$14.25	$14.75	$14.75	$14.38	$14.38
Feb.	14.00	14.25	14.75	14.75	14.38	14.38
Mar.	14.13	14.50	14.75	14.75	14.38	14.38
Apr.	14.25	14.75	14.75	14.75	14.38	13.34
May	14.25	14.75	14.75	14.75	14.38	13.15
June	14.25	14.75	14.75	14.75	14.38	13.25
July	14.25	14.75	14.75	14.75	14.38	13.25
Aug.	14.25	14.75	14.75	14.75	14.38	13.25
Sept.	14.25	14.75	14.75	14.53	14.38	13.25
Oct.	14.25	14.75	14.75	14.38	14.38	13.25
Nov.	14.25	14.75	14.75	14.38	14.38	14.25
Dec.	14.25	14.75	14.75	14.38	14.38	14.25
Average	14.20	14.65	14.75	14.64	14.38	13.69

* Price unchanged at $7.00 throughout 1944.



Ferroalloys Furnace Bricks

FERROMANGANESE, 80 PCT

Eastern Producers, Carloads, Cents Per Lb

	1937	1938	1939	1940*	1942**	1947**	1948†	1949	1950	1951	1952	1953‡	1954‡	1955
Jan.	3.57	4.58	3.79	4.46	5.36	6.03	6.47	7.21	7.74	8.27	8.31	10 10	10.00	9.50
Feb.	3.57	4.58	3.57	4.46	5.36	6.03	6.47	7.21	7.74	8.31	8.31	10.10	10.00	9.50
Mar.	3.97	4.58	3.57	4.46	5.36	6.03	6.47	7.56	7.74	8.31	8.31	10.10	10.00	9.50
Apr.	4.24	4.58	3.57	4.46	5.36	6.03	6.47	7.74	7.74	8.31	8.31	10.00	10.00	9.50
May	4.49	4.58	3.57	4.46	6.03	6.03	6.47	7.74	7.74	8.31	8.31	10.12	10.00	9.50
June	4.58	4.58	3.57	4.91	6.03	6.03	6.47	7.74	7.74	8.31	8.31	10.00	10.00	9.50
July	4.58	4.13	3.57	5.36	6.03	6.03	6.47	7.74	7.74	8.31	8.31	10.00	10.00	9.50
Aug.	4.58	4.13	3.57	5.36	6.03	6.03	6.47	7.74	7.74	8.31	9.65	10.00	10.00	9.50
Sept.	4.58	4.13	4.24	5.36	6.03	6.03	6.47	7.74	7.74	8.31	10.00	10.00	9.50	9.50
Oct.	4.58	4.13	4.46	5.36	6.03	6.47	7.23	7.74	7.74	8.31	10.00	10.00	9.50	9.50
Nov.	4.58	4.13	4.46	5.36	6.03	6.47	7.23	7.74	7.97	8.31	10.00	10.00	9.50	9.50
Dec.	4.58	4.13	4.46	5.36	6.03	6.47	7.23	7.74	8.09	8.31	10.10	10.00	9.50	10.25
Average	4.40	4.35	3.87	4.95	5.80	6.14	6.86	7.64	7.79	8.31	9.02	10.04	9.83	9.56

† Seaboard price prior to Oct. 7, 1948. ‡ Starting June, 1953, prices reflect new standard of 74 to 76 pct Mn. Prices prior to that converted from older gross ton pricing method. * Price unchanged at 5.36¢ through 1941. ** Price unchanged at 6.03¢ from 1943 through 1946.

50 PCT FERROSILICON

Cents per lb contained Si, Carloads, Delivered*

	1950	1951	1952	1953	1954	1955
Jan.	11.30	12.40	12.40	12.40	12.40	12.00
Feb.	11.30	12.40	12.40	12.40	12.40	12.00
Mar.	11.30	12.40	12.40	12.40	12.40	12.00
Apr.	11.30	12.40	12.40	12.40	10.80	11.00
May	11.30	12.40	12.40	12.40	10.80	11.00
June	11.30	12.40	12.40	12.40	10.80	11.00
July	11.30	12.40	12.40	12.40	10.80	11.00
Aug.	11.30	12.40	12.40	12.40	10.80	11.00
Sept.	11.30	12.40	12.40	12.40	11.52	11.00
Oct.	11.30	12.40	12.40	12.40	12.00	11.75
Nov.	12.00	12.40	12.40	12.40	12.00	11.75
Dec.	12.20	12.40	12.40	12.40	12.00	11.75
Average	11.43	12.40	12.40	12.40	11.56	11.43

* Feb shipping point after Oct. 1, 1955.

CHEM. BONDED CHROME BRICK

F.o.b. Baltimore, Dollars per Net Ton

	1949	1950	1951	1952	1953	1954	1955
Jan.	$69.00	$69.00	$82.00	$82.00	$86.00	$86.00	$86.00
Feb.	69.00	69.00	82.00	82.00	86.00	86.00	86.00
Mar.	69.00	69.00	82.00	82.00	86.00	86.00	86.00
Apr.	69.00	69.00	82.00	82.00	86.00	86.00	86.00
May	69.00	69.00	82.00	86.00	86.00	86.00	86.00
June	69.00	69.00	82.00	86.00	86.00	86.00	86.00
July	69.00	69.00	82.00	82.00	86.00	86.00	86.00
Aug.	69.00	71.40	82.00	82.00	86.00	86.00	86.00
Sept.	69.00	72.00	82.00	82.00	86.00	86.00	86.00
Oct.	69.00	75.00	82.00	86.00	86.00	86.00	86.00
Nov.	69.00	77.00	82.00	86.00	86.00	86.00	91.00
Dec.	69.00	77.00	82.00	86.00	86.00	86.00	91.00
Average	69.00	71.28	82.00	83.00	86.00	86.00	86.83

CHEM. BONDED MAGNESITE BRICK

F.o.b. Baltimore, Dollars per Net Ton

	1949	1950	1951	1952	1953	1954	1955
Jan.	$80.00	$80.00	$93.00	$93.00	$97.50	$97.50	$ 97.50
Feb.	80.00	80.00	93.00	93.00	97.50	97.50	97.50
Mar.	80.00	80.00	93.00	93.00	97.50	97.50	97.50
Apr.	80.00	80.00	93.00	93.00	97.50	97.50	97.50
May	80.00	80.00	93.00	93.00	97.50	97.50	97.50
June	80.00	80.00	93.00	93.00	97.50	97.50	97.50
July	80.00	80.00	93.00	93.00	97.50	97.50	97.50
Aug.	80.00	83.09	93.00	93.00	97.50	97.50	97.50
Sept.	80.00	83.00	93.00	93.00	97.50	97.50	97.50
Oct.	80.00	86.00	93.00	97.50	97.50	97.50	97.50
Nov.	80.00	88.00	93.00	97.50	97.50	97.50	102.00
Dec.	80.00	88.00	93.00	97.50	97.50	97.50	102.00
Average	80.00	82.08	93.00	94.13	97.50	97.50	98.59

SILICA BRICK STANDARD GRADE

Mt. Union, Pa., Ensley, Ala., Carloads per 1000 Brick, F.o.b. plant

	1950	1951	1952	1953	1954	1955
Jan.	$86.00	$94.60	$94.60	$99.30	$115.00	$120.00
Feb.	86.00	94.60	94.60	99.30	115.00	120.00
Mar.	86.00	94.60	94.60	99.30	115.00	120.00
Apr.	86.00	94.60	94.60	99.30	115.00	120.00
May	86.00	94.60	94.60	99.30	115.00	120.00
June	86.00	94.60	94.60	99.30	115.00	120.00
July	88.00	94.60	94.60	99.30	115.00	124.00
Aug.	88.00	94.60	94.60	99.30	115.00	128.00
Sept.	88.00	94.60	94.60	108.72	119.00	128.00
Oct.	91.16	94.60	99.30	115.00	120.00	128.00
Nov.	94.60	94.60	99.30	115.00	120.00	128.00
Dec.	94.60	94.60	99.30	115.00	120.00	128.00
Average	88.03	94.60	95.78	104.01	116.58	123.66

SPIEGELEISEN, 19 TO 21 PCT.

Palmerton, Pa., Carloads, Gross Ton

	1950	1951	1952	1953	1954	1955
Jan.	$65.00	$75.00	$75.00	$85.00	$86.00	$86.00
Feb.	65.00	75.00	75.00	85.00	86.00	86.00
Mar.	65.00	75.00	75.00	85.00	86.00	86.00
Apr.	65.00	75.00	75.00	85.00	86.00	86.00
May	65.00	75.00	75.00	85.00	86.00	86.00
June	65.00	75.00	75.00	86.00	86.00	86.00
July	65.00	75.00	75.00	86.00	86.00	86.00
Aug.	65.00	75.00	82.50	86.00	86.00	86.00
Sept.	67.50	75.00	85.00	86.00	88.00	86.00
Oct.	70.00	75.00	85.00	86.00	86.00	87.50
Nov.	70.00	75.00	85.00	86.00	86.00	88.00
Dec.	72.50	75.00	85.00	86.00	86.00	88.00
Average	66.66	75.00	78.96	85.58	86.00	86.45

BURNED MAGNESITE BRICK

F.o.b. Baltimore, Dollars per Net Ton

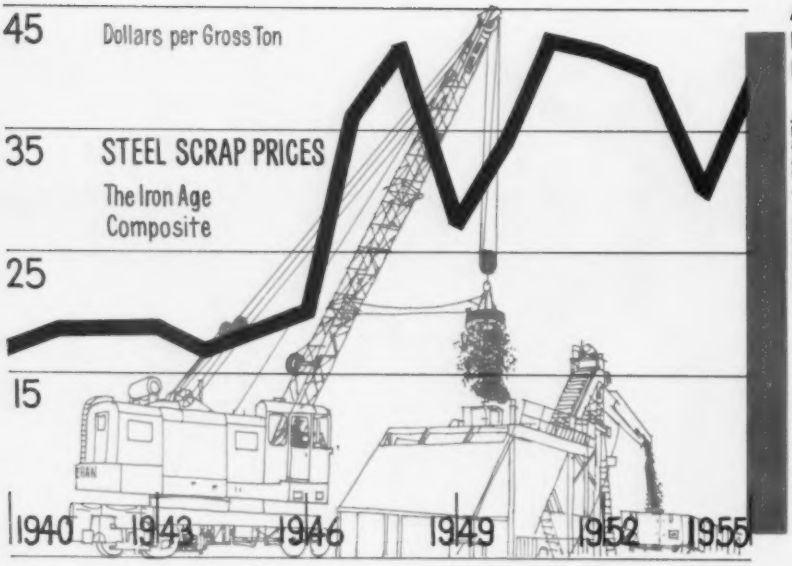
	1949	1950	1951	1952	1953	1954	1955
Jan.	$91.00	$91.00	$104.00	$104.00	$109.00	$109.00	$109.00
Feb.	91.00	91.00	104.00	104.00	109.00	109.00	109.00
Mar.	91.00	91.00	104.00	104.00	109.00	109.00	109.00
Apr.	91.00	91.00	104.00	104.00	109.00	109.00	109.00
May	91.00	91.00	104.00	104.00	109.00	109.00	109.00
June	91.00	91.00	104.00	104.00	109.00	109.00	109.00
July	91.00	91.00	104.00	104.00	109.00	109.00	109.00
Aug.	91.00	93.40	104.00	104.00	109.00	109.00	109.00
Sept.	91.00	94.00	104.00	104.00	109.00	109.00	109.00
Oct.	91.00	97.00	104.00	109.00	109.00	109.00	109.00
Nov.	91.00	99.00	104.00	109.00	109.00	109.00	114.00
Dec.	91.00	99.00	104.00	109.00	109.00	109.00	114.00
Avg.	91.00	93.28	104.00	105.25	109.00	109.00	109.33

FIRST QUALITY FIRE CLAY BRICK

Pa.,* Ky., Mo., Ill., Md., Ohio, F.o.b. Plant**

	1948§	1950	1951	1952	1953	1954	1955
Jan.	$73.00	$86.00	$94.60	$94.60	$ 99.30	$109.00	$114.00
Feb.	73.00	86.00	94.60	94.60	99.30	109.00	114.00
Mar.	73.00	86.00	94.60	94.60	99.30	109.00	114.00
Apr.	73.00	86.00	94.60	94.60	99.30	109.00	114.00
May	73.00	86.00	94.60	94.60	99.30	109.00	114.00
June	73.00	86.00	94.60	94.60	99.30	109.00	114.00
July	74.00	86.00	94.60	94.60	99.30	109.00	118.00
Aug.	80.00	86.00	94.60	94.60	99.30	109.00	122.00
Sept.	80.00	86.00	94.60	94.60	105.12	113.00	122.00
Oct.	80.00	91.16	94.60	99.30	109.00	114.00	122.00
Nov.	80.00	94.60	94.60	99.30	109.00	114.00	122.00
Dec.	80.00	94.60	94.60	99.30	109.00	114.00	122.00
Average	76.00	88.03	94.60	95.78	102.21	110.58	117.66

§ Price unchanged at $80.00 through 1949.
* Add $5.00 for Salina, Pa., after May, 1949.
** Carloads per 1000 brick.



Average of Iron Age Scrap Prices, Pittsburgh, Chicago, Philadelphia Per Gross Ton

	1944*	1945	1946	1947	1948	1949
Jan.	$19.17	$19.17	$19.17	$31.00	$40.81	$41.36
Feb.	19.17	19.17	19.17	33.31	40.35	33.21
Mar.	19.17	19.17	19.17	36.65	40.00	35.43
Apr.	19.17	19.17	19.17	33.65	40.31	23.86
May	19.17	19.17	19.17	29.81	40.60	22.67
June	19.17	19.17	19.17	32.79	40.68	20.78
July	19.17	19.17	19.17	37.95	41.60	19.33
Aug.	19.10	19.17	19.17	39.46	43.16	20.85
Sept.	17.87	19.17	19.17	37.77	43.16	25.67
Oct.	18.87	19.17	19.17	40.50	43.16	26.40
Nov.	18.54	19.17	23.34	41.21	43.04	26.98
Dec.	19.04	19.17	28.23	40.00	43.00	27.18
Average	18.56	19.15	20.27	36.36	41.65	27.56

	1950	1951	1952	1953	1954	1955
Jan.	$26.58	$46.15	$42.00	$42.00	$28.67	$34.62
Feb.	27.25	44.19	42.00	42.92	25.92	36.16
Mar.	28.05	43.00	42.00	44.18	23.83	37.27
Apr.	29.04	43.00	42.00	41.75	25.38	36.50
May	33.40	43.00	42.00	38.59	27.79	34.49
June	39.29	43.00	41.37	40.97	27.88	34.96
July	37.25	43.00	40.10	44.60	26.87	39.50
Aug.	39.85	43.00	42.00	43.46	26.33	43.96
Sept.	40.69	43.00	42.00	36.53	29.71	44.25
Oct.	40.67	42.50	42.00	32.67	32.83	44.75
Nov.	40.98	42.00	42.00	35.21	33.40	45.47
Dec.	44.02	42.00	42.00	31.33	32.46	50.42
Average	34.75	43.15	41.79	39.52	28.59	40.19

* Price unchanged at $19.17 throughout 1942 and 1943.

CHICAGO HEAVY MELTING SCRAP

Prices of No. 1 Scrap, Per Gross Ton‡

	1944*	1945	1946	1947	1948	1949
Jan.	$18.75	$18.75	$18.75	$29.75	$39.56	$40.06
Feb.	18.75	18.75	18.75	31.63	39.12	35.63
Mar.	18.75	18.75	18.75	36.69	38.95	33.70
Apr.	18.75	18.75	18.75	33.05	39.18	23.63
May	18.75	18.75	18.75	29.38	39.25	23.00
June	18.75	18.75	18.75	30.88	39.26	20.85
July	18.75	18.75	18.75	36.97	40.81	19.75
Aug.	18.75	18.75	18.75	39.88	41.75	22.00
Sept.	18.69	18.75	18.75	38.75	41.75	26.30
Oct.	16.90	18.75	18.75	40.50	41.75	25.50
Nov.	17.00	18.75	23.13	39.13	41.75	30.30
Dec.	18.69	18.75	27.25	38.90	41.75	26.75
Average	18.27	18.75	19.87	35.45	40.40	27.29

	1950	1951	1952	1953	1954	1955
Jan.	$26.70	$44.63	$41.50†	$41.50†	$28.13	$34.50
Feb.	27.50	43.02	41.50†	42.50	25.50	34.00
Mar.	28.25	42.50†	41.50†	43.50	24.50	34.90
Apr.	28.75	42.50†	41.50†	39.88	28.13	35.50
May	33.75	42.50†	41.50†	36.25	30.38	32.90
June	38.75	42.50†	40.75	39.30	31.40	33.25
July	37.25	42.50†	39.30	43.38	28.88	38.00
Aug.	39.15	42.50†	41.50†	42.25	29.50	40.90
Sept.	39.81	42.50†	41.50†	34.40	30.00	41.75
Oct.	39.75	42.50†	41.50†	31.00	33.75	43.25
Nov.	39.75	41.50†	41.50†	33.88	33.30	43.70
Dec.	43.44	41.50†	41.50†	31.00	33.00	49.13
Average	35.32	42.75	41.25	38.24	29.71	38.48

* Price unchanged at $18.75 throughout 1942 and 1943.
‡ Changed from net ton basis April 30, 1941.
† OPS basing point price ceiling.

PHILADELPHIA HEAVY MELTING

Prices of No. 1 Scrap, Per Gross Ton

	1944*	1945	1946	1947	1948	1949
Jan.	$18.75	$18.75	$18.75	$31.00	$42.50	$42.75
Feb.	18.75	18.75	18.75	33.38	41.50	39.75
Mar.	18.75	18.75	18.75	39.38	40.80	35.10
Apr.	18.75	18.75	18.75	33.10	41.50	23.00
May	18.75	18.40	18.75	29.69	42.31	22.00
June	18.75	18.25	18.75	33.63	42.50	19.50
July	18.75	18.75	18.75	39.45	43.12	17.50
Aug.	18.60	18.75	18.75	33.50	45.00	18.31
Sept.	16.66	18.75	18.75	36.80	45.00	23.35
Oct.	14.60	18.75	18.75	40.25	45.00	24.25
Nov.	15.50	18.75	22.94	42.63	44.75	24.50
Dec.	18.50	18.75	28.00	41.10	44.50	24.25
Average	17.01	18.68	19.67	36.50	43.20	26.19

	1950	1951	1952	1953	1954	1955
Jan.	$23.10	$46.70	$41.50†	$41.50†	$27.83	$32.87
Feb.	23.00	43.75	41.50†	42.50	25.00	37.00
Mar.	23.85	42.50†	41.50†	44.30	22.10	38.40
Apr.	25.39	42.50†	41.50†	42.75	21.50	37.00
May	28.70	42.50†	41.50†	40.80	22.75	35.60
June	34.63	42.50†	40.50	41.50	22.75	38.50
July	32.81	42.50†	40.65	43.69	23.25	40.50
Aug.	36.50	42.50†	41.50†	43.38	26.00	45.50
Sept.	38.50	42.50†	41.50†	35.90	28.13	45.70
Oct.	38.50	42.10†	41.50†	31.50	30.75	46.50
Nov.	39.44	41.50†	41.50†	34.50	32.70	47.10
Dec.	42.81	41.50†	41.50†	29.90	31.38	51.00
Average	32.27	42.75	41.35	39.33	26.16	41.31

* Price unchanged at $18.75 throughout 1942 and 1943.
† OPS basing point price ceiling.

PITTSBURGH HEAVY MELTING

Prices of No. 1 Scrap, Per Gross Ton

	1944*	1945	1946	1947	1948	1949
Jan.	$20.00	$20.00	$20.00	$32.25	$40.37	$41.25
Feb.	20.00	20.00	20.00	34.94	40.43	39.25
Mar.	20.00	20.00	20.00	39.85	40.25	36.30
Apr.	20.00	20.00	20.00	35.40	40.25	24.94
May	20.00	20.00	20.00	30.38	40.25	23.00
June	20.00	20.00	20.00	33.88	40.25	22.00
July	20.00	20.00	20.00	38.45	40.87	20.75
Aug.	19.95	20.00	20.00	40.00	42.75	21.94
Sept.	18.25	20.00	20.00	37.75	42.75	27.35
Oct.	16.10	20.00	20.00	40.75	42.75	29.44
Nov.	17.13	20.00	23.94	41.88	42.75	31.95
Dec.	19.94	20.00	28.00	40.00	42.75	30.75
Average	19.28	20.00	21.66	37.13	41.36	29.08

	1950	1951	1952	1953	1954	1955
Jan.	$29.95	$47.13	$43.00†	$43.00†	$30.25	$36.50
Feb.	31.25	45.78	43.00†	43.75	27.25	37.50
Mar.	32.13	44.00†	43.00†	44.75	24.90	38.50
Apr.	33.00	44.00†	43.00†	42.63	26.50	37.00
May	37.75	44.00†	43.00†	39.00	30.25	34.70
June	44.50	44.00†	42.90	42.10	29.50	35.25
July	41.50	44.00†	40.45	46.75	28.50	40.00
Aug.	43.90	44.00†	43.00†	44.75	29.50	45.00
Sept.	43.75	44.00†	43.00†	39.30	31.00	44.50
Oct.	43.75	43.00†	43.00†	35.50	34.00	44.50
Nov.	43.75	43.00†	43.00†	37.25	34.20	45.80
Dec.	45.57	43.00†	43.00†	33.10	33.00	51.13
Average	39.16	44.21	42.78	40.99	29.90	40.87

* Price unchanged at $20.00 throughout 1942 and 1943.
† OPS basing point price ceiling.

MACHINERY CAST AT CHICAGO

No. 1 Scrap Delivered Per Gross Ton

	1940	1941*	1946*	1947	1948	1949
Jan.	$14.00	$18.88	$20.00	$43.38	$68.00	$57.25
Feb.	13.75	19.25	20.00	44.56	65.25	46.00
Mar.	13.56	20.75	20.00	46.00	68.50	41.20
Apr.	14.81	22.33‡	20.00	42.70	73.12	29.63
May	16.31	21.40	20.00	38.00	72.50	27.90
June	17.31	20.00	20.00	41.81	69.90	28.58
July	16.75	20.00	20.00	46.00	71.50	30.75
Aug.	16.88	20.00	20.00	49.38	74.30	39.30
Sept.	17.13	20.00	22.50	49.50	71.25	42.25
Oct.	17.75	20.00	25.00	51.90	69.87	41.25
Nov.	18.00	20.00	32.26	52.75	72.20	32.88
Dec.	19.13	20.00	41.05	60.30	69.50	39.85
Average	16.28	20.21	23.40	47.12	70.48	39.00

	1950	1951	1952	1953	1954	1955
Jan.	$38.50	$63.00▼	$52.00▼	$46.63	$35.75	$44.75
Feb.	39.00	52.00▼	52.00▼	46.50	38.20	44.87
Mar.	39.75	52.00▼	46.63†	47.20	38.20	46.00
Apr.	41.50	52.00▼	43.45†	45.63	39.38	47.25
May	45.70	52.00▼	43.00†	42.38	41.25	45.60
June	47.25	52.00▼	41.23†	43.30	40.80	46.37
July	45.50	52.00▼	39.10†	45.63	39.50	49.12
Aug.	49.10	52.00▼	44.90†	45.25	39.50	52.50
Sept.	50.25	52.00▼	45.50†	38.20	41.25	52.75
Oct.	52.60	52.00▼	45.90†	36.75	43.25	53.25
Nov.	60.38	52.00▼	45.19†	38.50	42.50	53.70
Dec.	64.50	52.00▼	43.30†	36.90	43.63	55.50
Average	47.85	52.92	45.18	42.73	39.74	49.32

‡ Changed from net ton bases April 30, 1941.
* Price unchanged at $20.00 from 1942 through 1945. Ceiling prices do not include delivery costs.
† Delivered. Nominal $3 per ton deducted for shipping, commission to put prices on F.o.b. basis for comparison purposes.
▼ OPS ceiling shipping point prices.

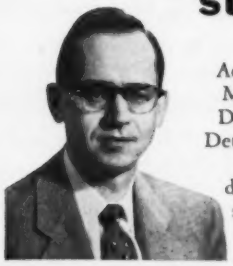
CUPOLA CAST AT CINCINNATI

No. 1 Scrap Delivered, Per Gross Ton

	1950†	1951†	1952†	1953†	1954	1955
Jan.	$36.90	$65.50▼	$49.00▼	$49.00	$36.50	$39.50
Feb.	35.75	49.00▼	49.00▼	48.75	36.50	39.50
Mar.	38.50	49.00▼	49.00▼	48.30	34.50	39.50
Apr.	40.50	49.00▼	49.00▼	44.00	35.25	39.50
May	44.90	49.00▼	49.00▼	41.75	38.00	40.50
June	46.75	49.00▼	49.00▼	41.50	38.50	40.50
July	46.50	49.00▼	43.50§	42.25	38.50	42.50
Aug.	49.10	49.00▼	45.90§	42.50	38.50	44.50
Sept.	53.50	49.00▼	49.00▼	42.10	38.50	44.50
Oct.	59.20	49.00▼	46.00§	41.25	39.50	46.50
Nov.	63.75	49.00▼	46.00§	37.50	39.50	44.50
Dec.	65.25	49.00▼	46.00§	36.90	39.50	45.50
Average	48.39	50.38	47.53	42.62	37.77	42.25

† Average of No. 1 cupola cast prices. Ceiling prices do not include delivery costs.
▼ OPS ceiling shipping point prices.
§ Delivered. Nominal $3 a ton deducted for shipping, commissions to put prices on comparable F.o.b. basis under OPS system.

AIM* to make your products easier to handle and store with Acme Steel Strapping ideas



Acme Idea Man Marty Meehan, Detroit, advised Detroit Brass and Malleable in developing this steel strapping method.

ask your
*Acme Idea Man
to help solve your problems

Detroit Brass and Malleable Company did it with a new package and Acme Steel Strapping. (Idea No. S5-3.) Small boxes of iron pipe fittings are packed in larger fibre shipping containers. These are securely closed and reinforced with Acme Steel Strapping, the economical and efficient way to assure product protection and ease of handling.

The idea found enthusiastic customer acceptance, too. Formerly packed loose in bags, fittings were dumped into bins in warehouses and stores. Now, tightly strapped boxes are quickly stacked for storage. Inventory is easier . . . and there is more efficient use of warehouse space. Truck shipments are loaded and unloaded faster. Five steel strapped boxes can be moved at one time with a hand truck where formerly only one bag could be handled.

Ideas like this are being constantly introduced by your *Acme Idea Man and they extend to *every* industry. His ingenuity and experience are yours without obligation. Call your nearest Acme Steel office for an analysis of your shipping system. Or write Dept. EF-16 for further information.

ACME STEEL PRODUCTS DIVISION

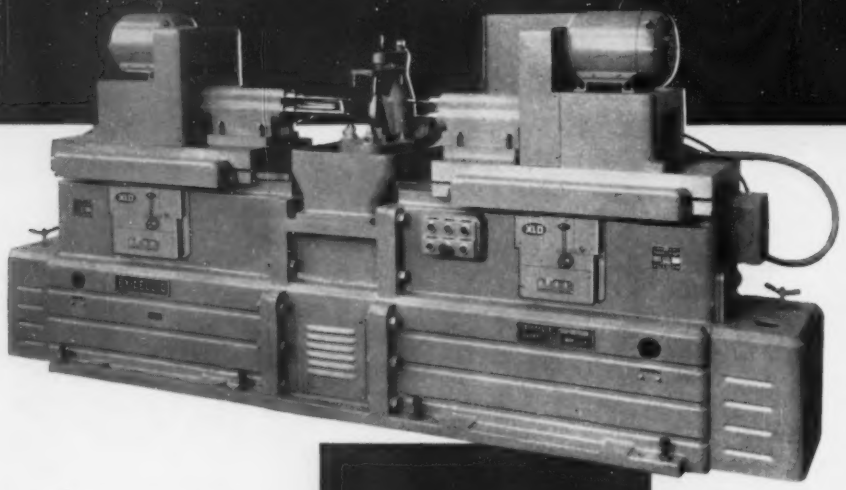
ACME STEEL COMPANY

2840 ARCHER AVENUE, CHICAGO 8, ILLINOIS • ACME STEEL CO. OF CANADA, LTD., TORONTO

ACME STEEL

Modernize Today for Profits Tomorrow

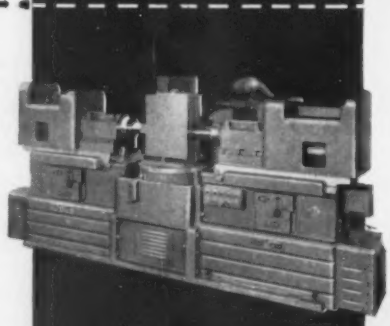
WITH FAST, VERSATILE PRECISION WAY MACHINES



EX-CELL-O TWO-WAY: Operates from a single push-button station. Handles large, heavy work. Fixture section can be designed to accommodate the way units from any angle.

Units may be re-arranged around fixture or new fixture sections designed for different operations.

EX-CELL-O ONE-WAY: A standard way unit combined with a fixture unit to suit the work. Large, heavy, and awkward parts, loaded in the fixture, remain stationary; the spindles advance to the work.



EX-CELL-O THREE-WAY: Standard way units are electrically interlocked to operate simultaneously, or in any sequence. Fast and efficient for machining parts from three directions and holding accurate locations.

EX-CELL-O FOUR-WAY: Controlled from a central push-button station. Particularly suitable for machining parts from four directions simultaneously, and performing progressive operations.

55-50

EX-CELL-O

WAY TYPE PRECISION BORING MACHINES ARE PROFIT INSURANCE

Way Machines perform such operations as precision boring, turning and facing. They consist of one or more standard way units combined with a fixture section. Each way unit has its own hydraulic system and controls to operate the spindle slide. Tooling and fixture are added to suit the individual operation. Get details from your Ex-Cell-O representative or write for Way Machine Catalog.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

XLO
EX-CELL-O for PRECISION

The Iron Age SUMMARY . . .

Steel likely to set new production record in '56 . . . Labor is biggest dark cloud on the horizon . . . Steel prices will be up $11 . . . No letup in demand.

Another Record In '56 . . . Steel producers are off to a running start toward a probable all-time production record of 118-120 million ingot tons in 1956. There's just one dark cloud over the horizon: steel labor.

The fuss made over automotive production cutbacks is premature. No one will really know until later in 1956 whether consumer disinterest is anything more than a year-end breather. Demand for new cars is still strong.

But steel labor is something else. A stalemate at the bargaining table next June could knock everything into a cocked hat. The United Steelworkers are loaded for bear. They want higher wages, supplementary unemployment benefits (guaranteed wage), an unqualified union shop, and improved pension and social insurance benefits.

That's a big order. And steel companies will buy only part of it. Any one of these principal demands could lead to a knock-down-drag-out battle that would cost enough steel production to make 1955 look like a period of plenty.

The Price Outlook . . . Another industry problem is prices. Revisions to date have been more in the nature of technical adjustments to bring extra processing costs into line. Base price increases have been scattered and put into effect largely by the smaller producers.

But the need for a general price increase is still present. A good guess is that steel prices will be up an average of $3 per ton by March. The labor settlement will be followed by another boost, probably in the neighborhood of $8. This would make a total for the year of $11.

The auto letdown will bring no relief to other consumers. Detroit has no intention of bypassing tonnages from regular suppliers.

For the first time in years, steel producers are entering a new year with orders outrunning production, a 3-to-4-month backlog on the books and a full schedule for the first six months.

Inventories Down . . . Consumers are facing 1956 with their inventories down and relatively little chance of improving them soon. But they'll be in there pitching to rebuild stocks both to assure continued production in their own plants and as a hedge against a possible strike. Working against them will be the mills' efforts to bring deliveries into line with promises, the possibility of more acute mill maintenance problems, and the producers' need for steel for expansion.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,352	2,340	2,417	1,978
Ingot Index (1947-1949=100)	146.2	145.5	150.3	123.0
Operating Rates				
Chicago	98.5	99.0*	99.0	85.0
Pittsburgh	95.0	100.0*	102.0	78.0
Philadelphia	103.0	100.0*	103.0	73.0
Valley	95.0	92.0	98.0	76.0
West	97.5	98.0	102.5	87.0
Detroit	95.0	95.0*	98.0	91.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	95.0	95.0*	102.3	83.0
Birmingham	95.0	92.0*	94.5	74.5
S. Ohio River	90.0	90.0*	95.5	94.5
Wheeling	100.0	100.0*	103.0	98.0
St. Louis	102.0	103.0*	104.0	74.5
Northeast	82.0	82.0*	88.5	74.5
Aggregate	97.5	97.0	100.2	82.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$53.33	$53.00	$49.50	$34.17
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	107.75	109.375	103.875	88.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

Background on Bar Changes

Special quality bars now account for more than half U. S. Steel's carbon bar output . . . New price policy set up two base prices . . . Extra becomes part of base price.

◆ MAJOR REASON behind U. S. Steel's setting up two hot-rolled carbon steel bar classifications is that consumption of so-called "special quality" bars has grown to the point where it accounts for better than 50 pct of the company's carbon bar production.

What U. S. Steel did was to set up two base prices. Merchant quality bar base remained unchanged, but a new base $7 per ton higher was established for special quality. Thus, what formerly was an extra for special quality became base price.

Many consumers, including automotive, industrial fasteners, and farm equipment, have learned to substitute the special quality bar for alloy bar in some applications.

Extra revisions will result in what the company described as "a slight increase." Merchant and special quality size extras were revised, chiefly upward; quantity extras are unchanged. Chemical extras, mostly on special quality bars, were increased and decreased, with the emphasis on the downside.

Reinforcing bar extras were changed for bar numbers 8, 9, 10, and 11, from $6 to $7 per ton in line with changes in other rounds. Carbon rerolling and forging blooms, billets, and slabs extras also were revised.

U. S. Steel Export Co. announced new base prices of $5.45 for hot-rolled bars, special quality; wire rods, $5.56; bright nail wire, $6.77; black annealed wire, $7.52, and galvanized plain wire, $8.09.

Allegheny Ludlum Steel Corp. has increased price of sheets made of its high-temperature alloy, A-286, to $3 per lb. The alloy was developed primarily as a forging material for jet aircraft engine applications.

For the ninth year in succession, steelmaking companies have increased U. S. capacity—to a new high total of 128,363,090 net tons as of Jan. 1, 1956.

Benjamin F. Fairless, president, American Iron and Steel Institute, reports that large scale expansion and improvement programs brought about a net gain of 2,534,780 tons.

SHEETS AND STRIP . . . Going into the early weeks of the new year, virtually every major market area reports that the demand-supply situation on sheets and strip will be tighter than at any time in the months just passed. No secret is the fact that both large and small consumer inventories in both products are all but down to floor level. Heavy carryovers on mill deliveries along both seaboards and at such inland points as **Detroit**, **Chicago** and **Cleveland** preclude any improvement in the situation for weeks to come. And, in nine out of 10 instances, heavy consumer production schedules are far in excess of anything which local warehouse stocks could adequately take care of. Indications in the automotive capital are that there will be a further cutback in auto output at the end of January. Best guess is that first quarter production will come to around 15 pct less than was planned originally. Automotive executives point out that they can't get enough steel to build all the cars scheduled in the first place. So, cutbacks on that score, are in order. Not to be overlooked, however, is the general falloff in automotive sales. If they drop, as is expected, cutbacks might be announced even sooner. Meanwhile, auto producers continue to go after all the steel they can get. In some instances, the supply situation is beginning to ease slightly, but not at the mill level so far. Some **Detroit** warehouses report that demand for sheet has fallen off in the last 10 days. This is some reflection on the actual cutbacks in automotive output.

BARS . . . Little noticeable letup in consumer demand for hot-rolled bars is reported in any market area. Most heavy bar consumers are pegging any hopes for betterment in mill delivery schedules on the second quarter. Even the newly announced price schedules already instituted by some major producers are expected to have little influence on producers' sales records in the weeks ahead. Automakers and the other big bar consumers so far have continued their heavy purchase patterns at an uninterrupted pace.

PLATE . . . There's some feeling in **Pittsburgh** that there's a big IF behind recent comments on specific dates when the railroads will get caught up on their freight car production schedules. Consensus is that the roads won't reach full production schedules much before the second half of '56. Meanwhile, the scarcity of plate in all major production centers is still very much a reality. Conversion deals in the **East** and **midwest**, plus some reports of gray market activity in **Detroit** merely reflect signs of the times.

IRON ORE . . . In an early move to compensate for modest 1955 price increases, Cleveland Cliffs Iron Co., **Cleveland**, has increased its iron ore prices 85¢ per ton for the 1956 season. Other producers indicate they'll soon match the new level. Last year, U. S. Steel took the lead in announcing increases of 20¢ a ton. Any freight increases this year will also have to be sustained by purchasers. Contracts for this year are firm, based on prices at the mine. Ore producers made this stipulation this year in view of rail applications to the Interstate Commerce Commission for a blanket 7 pct increase.

Purchasing Agent's Checklist:

BUSINESS: What's the outlook for 1956? . . . . . p. 136

MATERIALS: What can you expect in materials availability? . . . p. 140

LABOR: Here's what to expect from labor this year . . . . . p. 144

GOVERNMENT: How will Washington affect your business? . . p. 152

Comparison of Prices

(Effective Jan. 3, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Jan. 4 1956	Dec. 28 1955	Dec. 7 1955	Jan. 4 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Staint's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Jan. 4 1956	Dec. 28 1955	Dec. 7 1955	Jan. 4 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$53.50	$53.50	$49.50	$36.50
No. 1 steel, Phila. area	54.50	54.50	49.50	31.50
No. 1 steel, Chicago	51.00	51.00	49.50	34.50
No. 1 bundles, Detroit	45.50	45.50	45.50	26.50
Low phos., Youngstown	55.00	55.00	54.50	36.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	54.50	42.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	56.50	42.00
No. 1 mach'y cast, Chicago	56.50	56.50	56.50	44.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$53.33	$53.00	$49.50	$34.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	107.75†	109.375	103.875	88.00
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	15.30	15.30	15.30	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	22.20
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 315→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. *Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Prices Hold Generally Firm

Chicago slide checked . . . Steelmaking scrap takes price jump in Cleveland . . . Pittsburgh reports gains . . . Little change in the East . ..Composite up 33¢.

◆ PRICES in most areas held firm or moved upward this week as continuing strong demand offset consumer efforts to regain control. The only tendency toward weakness appeared in Chicago, where prices dropped off slightly last week and held steady this week.

Hot spot for the moment is Cleveland, where steelmaking grades advanced $3.50 per ton. Consumers there reached out in desperation for industrial material, some of which brought $58-59 at the broker level. Valley prices moved up in sympathy.

In Pittsburgh, prices advanced $1 to $55, top, for No. 1 heavy melting. With Chicago and Philadelphia unchanged, THE IRON AGE Composite price advanced 33¢ to $53.33. Industrial list brought $60 to $61 in Pittsburgh.

The advance that brought prices to record-breaking levels shows little or no sign of leveling off. Export demand continues strong and the mills have been forced into the market in keeping with high operating rates and the prospect of capacity operations through the first half.

The letdown in automotive production will tend to strengthen the market on a short-range basis because fewer cars means generation of less scrap. And despite the cutbacks, car producers are continuing to press the mills for steel deliveries.

Pittsburgh . . . The market is generally stronger as activity in premium grades stepped up at increased prices. Brokers were busy trying to fill orders and lay down scrap for anticipated new orders. A tonnage of industrial bundles brought $60-$61 locally which further emphasized the demand for good grades. No. 1 heavy melting edged up another dollar, but secondary open hearth grades are dragging. Lo phos, No. 1 rr heavy melting and short rails also show $1 increases. Blast furnace grades up.

Chicago . . . After a slight adjustment the week previous, Chicago scrap held as buying began to appear in strength. An offer for factory bundles at $53 was offset by purchases of representative tonnages at previously established levels. Similarly fresh purchases of bellwether steelmaking grades indicated the continuing strength of the market. In several grades purchases or offers to buy at prices below the market spread merely confused the market but did little to weaken it. In some grades, and particularly electric furnace, the effect was to increase the range of prices at which scrap was moving.

Philadelphia . . . Steelmaking grades are standing firm, but blast furnace grades are up 50¢. Clean cast chemical borings are up $1 to $43. Strong export market is a primary factor in stimulating stronger domestic mill buying of the past few weeks. Some dealers report they are operating on a week's stockpile as a protective measure against further increases.

New York . . . The holidays have had little if any effect on market strength in this area. Demand continues strong for all grades. The current price of $49 per gross ton has so far held for No. 1 heavy melting, although scattered sales at higher prices are rumored as some brokers scurry to cover commitments. But large tonnages are still moving at $49. High blast furnace demand has boosted turnings prices $1 for all grades. Cast continues to forge ahead.

Detroit . . . The scramble for scrap from the January lists sent prices up $2 all along the line this week. Broker bidding was the main cause of the increase. Most of the tonnage on one of the big three lists was purchased for a mill in the Valley district. No local buying has been reported yet.

Cleveland . . . No. 1 heavy melting jumped $3.50 per ton to $55.50, top, this week in keeping with growing strength of the market. Another indication of the upward trend is the bidding for local industrial scrap lists. One broker reportedly paid $58-59 dollars for 13,000 tons listed by two auto plants. The material ultimately was bought by a leading consumer in the area. Valley prices moved up in keeping with the local increase. Foundry steel in Cleveland rose $3 per ton on basis of a purchase by an automotive foundry. New purchases also moved up 2 foot cut structural and plate $3.50.

Birmingham . . . Market here remains relatively quiet. Consumers are still riding along on last year's purchases and prices are holding.

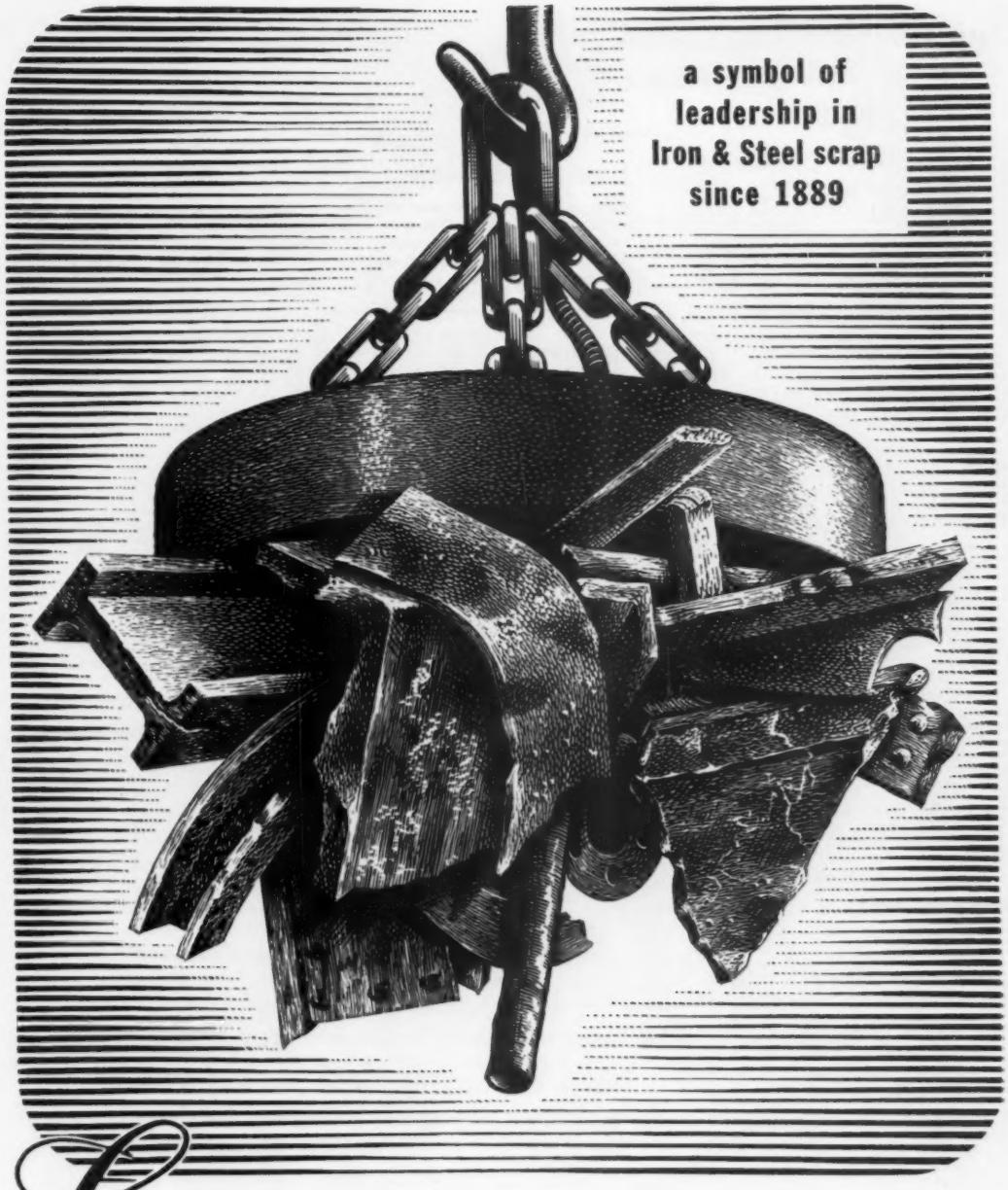
St. Louis . . . Top steelmaking grades moved up $3.50 per ton this week to restore the normal relationship with other markets. The boost reflected actual market conditions in the area, including material purchased from out-of-district.

Cincinnati . . . Mill on fringes of district purchased regular monthly bundles from nearby plant at $3 over December prices which is equal to current quoted levels in Cincinnati including freight. Delivered price was $50 for No. 1 grades, $44 for No. 2 steel and $40 for No. 2 bundles. Local Cincinnati price expected to rise this week to keep local scrap in area. Foundry market continues strong.

Buffalo . . . Reflecting stronger market conditions, prices moved up $2 per ton this week. No. 1 heavy melting is $48, top.

Boston . . . Prices held generally firm last week as the post-holiday saw only minor adjustments. Eastern Pennsylvania mills continue to lead domestic buyers. Export remains strong.

West Coast . . . Market is holding steady in Los Angeles, San Francisco, and Seattle. Exports continue fairly active, keeping steady price pressure on domestic consumers.



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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Scrap Prices *(Effective Jan. 3, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	43.00 to 44.00
Machine shop turn	33.00 to 34.00
Mixed bor. and ms. turn	33.00 to 34.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. punch'gs plate	59.00 to 60.00
Heavy turnings	46.00 to 47.00
No. 1 RR. hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	45.00 to 46.00

Chicago

No. 1 hvy. melting	$51.00
No. 2 hvy. melting	42.00
No. 1 factory bundles	55.00
No. 1 dealers' bundles	51.00
No. 2 dealers' bundles	41.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. forge crops	60.00 to 61.00
Low phos. punch'gs plate	57.00 to 58.00
Low phos. 3 ft and under	56.00 to 57.00
No. 1 RR. hvy melting	54.00 to 55.00
Scrap rails, random lgth.	64.00 to 65.00
Rerolling rails	72.00 to 74.00
Rails 2 ft and under	69.00 to 70.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	59.00 to 60.00
Angles and splice bars	66.00 to 67.00
RR. steel car axles	67.00 to 68.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	44.00 to 45.00
Cast iron brake shoes	41.00 to 42.00
Cast iron car wheels	50.00 to 51.00
Malleable	63.00 to 64.00
Stove plate	43.00 to 44.00

Philadelphia Area

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	36.50 to 37.50
Mixed bor. short turn.	36.50 to 37.50
Cast iron borings	36.50 to 37.50
Shoveling turnings	38.50 to 39.50
Clean cast chem. borings	42.00 to 43.00
Low phos. 5 ft and under	57.00 to 58.00
Low phos. 2 ft and under	59.00 to 60.00
Low phos. punch'gs	59.00 to 60.00
Elec. furnace bundles	55.00 to 56.00
Heavy turnings	48.00 to 49.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
Rails 18 in. and under	65.00 to 67.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	52.00 to 53.00
Cast iron car wheels	57.00 to 58.00
Malleable	64.00 to 65.00
Unstripped motor blocks	39.00 to 40.00
No. 1 machinery cast.	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$54.50 to $55.50
No. 2 hvy. melting	44.50 to 45.50
No. 1 bundles	54.50 to 55.50
No. 2 bundles	44.00 to 45.00
No. 1 busheling	54.50 to 55.50
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Cut struct'r'l & plates, 2 ft & under	59.00 to 60.00
Drop forge flashings	54.50 to 55.50
Low phos. punch'gs, plate	55.50 to 56.50
Foundry steel, 2 ft & under	56.50 to 57.50
No. 1 RR. heavy melting	55.00 to 56.00
Rails 2 ft and under	70.00 to 71.00
Rails 18 in. and under	71.00 to 72.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	50.00 to 51.00
Malleable	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	46.50 to 47.50
No. 1 bundles	57.00 to 58.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	32.00 to 33.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. plate	60.00 to 61.00

Buffalo

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 busheling	47.00 to 48.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	51.00 to 52.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	62.00 to 63.00
RR. steel wheels	52.00 to 53.00
RR. spring steel	52.00 to 53.00
RR. couplers and knuckles	52.00 to 53.00
No. 1 machinery cast.	49.00 to 50.00
No. 1 cupola cast.	45.00 to 46.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles, openhearth	47.00 to 48.00
No. 2 bundles	33.00 to 34.00
New busheling	47.00 to 48.00
Drop forge flashings	46.50 to 47.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. punch'gs, plate	47.00 to 48.00
No. 1 cupola cast.	44.00 to 45.00
Heavy breakable cast.	38.00 to 39.00
Stove plate	39.00 to 40.00
Automotive cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	40.50 to 41.50
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.50 to 37.50
Machine shop turn.	30.50 to 31.50
Cast iron borings	32.50 to 33.50
Shoveling turnings	32.50 to 33.50
No. 1 RR. hvy. melting	55.00 to 56.00
Rails, random lengths	60.50 to 61.50
Rails, 18 in. and under	66.00 to 67.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	59.00 to 60.00
Std. steel car axles	61.00 to 62.00
RR. specialties	60.00 to 61.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	40.00 to 42.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	41.00 to 42.00
Cast iro ncar wheels	50.00 to 51.00
Rerolling rails	70.00 to 71.00
Malleable	50.00 to 51.00
Unstripped motor blocks	41.00 to 42.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	45.00 to 46.00
Elec. furnace, 3 ft & under	50.00 to 51.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Clean cast chem. borings	28.00 to 29.00
No. 1 machinery cast.	45.00 to 46.00
Mixed cupola cast.	42.00 to 42.50
Heavy breakable cast.	42.00 to 42.50
Stove plate	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	44.00 to 45.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast.	49.00 to 50.00
Mixed yard cast.	46.00 to 47.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	18.00 to 19.00
Electric furnace bundles	47.00 to 48.00
Bar crops and plate	53.00 to 54.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	63.00 to 64.00
Angles & splice bars	60.00 to 61.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast.	30.00 to 31.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	39.00 to 40.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	55.00 to 56.00
Rails, random lengths	61.00 to 62.00
Rails, 18 in. and under	68.00 to 69.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	54.50 to 55.50

San Francisco

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	36.00
No. 3 bundles	29.00
Machine stop turn.	20.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	50.00

Los Angeles

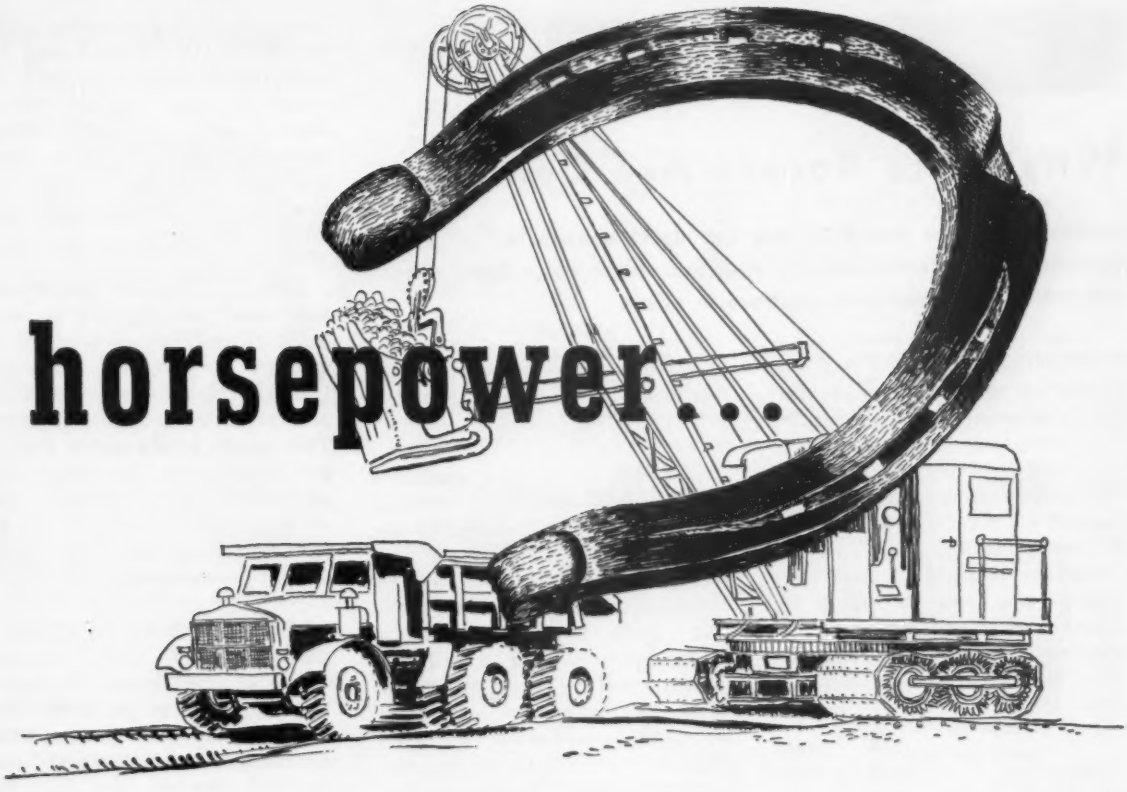
No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	20.00
Shoveling turnings	23.00
Cast iron borings	20.00
Elec. furn. 1 ft and under.	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	48.00

Seattle

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	40.00
No. 2 bundles	34.00
No. 3 bundles	30.00
No. 1 cupola cast.	40.00
Mixed yard cast.	40.00

Hamilton, Ont.

No. 1 hvy. melting	$43.50
No. 2 hvy. melting	39.50
No. 1 bundles	43.50
No. 2 bundles	36.00
Mixed steel scrap	37.50
Bushelings	33.50
Bush., new fact. prep'd	41.50
Bush., new fact. unprep'd.	37.50
Machine shop turn.	16.00
Short steel turn.	25.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	52.50
Cast scrap	42.00 to 45.00



horsepower...

One of the aids to the development of nineteenth-century horsepower was the invention of a machine-made horseshoe—patented by Henry Burden, of Troy, New York, in 1835.

For today's vast power needs, horseshoes will not suffice. Motors, machines and engines of iron and steel have to be maintained, replaced, and increased in number, to meet the ever-growing power load demanded by commerce, industry, agriculture and armament. . . . The supply of scrap must continuously keep pace with the insistent needs for steel.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

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231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Why Price Boosts Are Coming

Expansion in some industries may not match growth in demand . . . Uncertain copper situation makes price hikes almost inevitable . . . Labor costs continue to climb.

◆ NINETEEN FIFTY-FIVE was a year of expansion for nonferrous producers. Faced with more customers than they had metal to sell, producers in all of the major nonferrous fields authorized substantial sums for bigger and more efficient facilities.

But the excess of demand over supply also had its effect on prices. All of the major nonferrous metals are finishing the year at a higher price than they finished 1954.

	1954	1955
Copper	30.00	43.00
Aluminum (ingot)	22.20	24.40
Zinc	11.50	13.00
Lead	14.80	15.30
Tin	87.25	107.00
	(cents per lb)	

In 1956 the results of the expansion programs will start to be felt on the market. However, consumers have also been expanding their operations and are faced with increased export competition for nonferrous metals. Outlook for prices in 1956:

COPPER . . . Copper producers have the facilities to meet demand. However the biggest source of import copper, Chile, will be the biggest stumbling block. Since copper is the mainstay of its economy, Chile is interested in a higher price. As long as the European price stays above that of the U. S. (and indications are that it will), Chile will exert as much diplomatic pressure as it can muster for a higher U. S. price. Strikes are very possible in both Chile and the U. S., keeping production below demand. There is a strong possibility that producers' copper will cost 46¢ per lb before 1956 is half over.

ALUMINUM . . . The aluminum industry is winding up an all-time record year. But from the looks of expansion expenditures, the record will not stand long. Despite the increase in demand, the currently tight market should ease. However, labor and management will negotiate in midsummer and wage increases are likely. If this happens, aluminum price will go up ½-1¢ per lb.

ZINC . . . The zinc industry has had a good year. Trading has been brisk throughout the entire 12 months. As the year ends, the London metal market reports the highest price for zinc since 1952. This would put imported zinc 1¢ per lb or so over the going U. S. price and is a good indication that an approximate increase in domestic zinc of about the same amount is imminent.

LEAD . . . Production of lead in 1955 remained fairly constant while consumer demand increased. Trading was at a brisk rate with usual seasonal changes in the market minimized. The law of supply and demand will probably permit the producers to increase their price ½¢ per lb.

TIN . . . Shortage of spot tin near the end of the year pushed the tin price up about 13¢ in a matter of a month. This is the first indication that demand may outdistance supply. However, this should not occur in 1956. The tin price will probably hold fairly firm between $1 and $1.10. An international tin agreement to stabilize the world price at between 90¢ and $1.00 needs only the signature of Indonesia to start the administrative wheels turning.

SCRAP . . . Secondary metal markets will follow the tide of the primary. As long as demand holds up the price of scrap will fluctuate on a slight upward trend. The only immediate major increase will probably be in copper and brass scrap. The current strike in Chile is hurting consumers in this country. Supplies of virgin copper are way down and the demand for scrap to make up the difference will push copper scrap up several dollars right at the start of the year.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in December based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	107.564
Del'd Conn. Valley	43.00	Zinc, E. St. Louis	13.00
Lake copper, delivered	43.00	Lead, St. Louis	15.30

Note: Quotations are going prices

Lead Price Jumped ½c to 15.80 St. Louis
Reason—Pressure from London Market

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Dec. 28	Dec. 29	Dec. 30	Dec. 31	Jan. 2	Jan. 3
Copper, electro, Conn.	43.00	43.00	43.00	....	....	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	....	43.00
Tin, Straits, New York	108.375	107.50	107.75	107.75	....	107.50*
Zinc, East St. Louis	13.00	13.00	13.00	13.00	....	13.00
Lead, St. Louis	15.30	15.30	15.80	15.80	....	15.80

Note: Quotations are going prices **Tentative*

Nonferrous Prices *(Effective Jan. 3, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	46.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6 S	41.6–43.3	56.6–60.2
12 14	42.3–43.7	57.5–61.8
24 26	45.3–45.7	67.7–72.1
36 38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size*	¼	⅜–⅝	¾–1	1¼–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 64¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ⅜ to ¾ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ¾ diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅝ to ¾ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.12	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	56.55	56.49	....
Yellow brass	52.27	52.21	....
Red brass	58.09	58.03	....
Naval brass	52.83	49.94	48.40
Leaded brass	....	....	48.42
Com. bronze	60.18	60.12	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	81.00	81.50	....
Munts metal	53.74	49.55	50.80
Ni silver, 10 pct	66.00	68.33	70.68

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
Strip $1.84
Rod, bar, wire 1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	....	71	....

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 24.40
Aluminum pig 22.50
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb cont'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 43.00
Copper, Lake, delivered 43.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz. $100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 32.50
ingot 33.25
Magnesium, sticks, 100 to 500 lb. 53.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $280 to $284
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. ..... $22.20 to $24
Platinum, dollars per troy oz. $97 to $99
Silver, New York, cents per troy oz. 90.50
Tin, New York 107.75*
Titanium sponge, grade A-1 $3.15 to $3.45
Zinc, East St. Louis 13.00
Zinc, New York 13.50
Zirconium, sponge $10.00
* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 42.00
No. 120 ..... 41.25
No. 123 ..... 40.50
80-10-10 ingot
No. 305 ..... 45.75
No. 315 ..... 44.00
88-10-2 ingot
No. 210 ..... 58.25
No. 215 ..... 54.75
No. 245 ..... 48.75
Yellow ingot
No. 405 ..... 33.25
Manganese bronze
No. 421 ..... 37.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 32.75-34.00
0.60 copper max. 32.50-33.75
Piston alloys (No. 122 type) 31.50-32.50
No. 12 alum. (No. 2 grade) 31.00-31.50
108 alloy 31.00-31.50
195 alloy 32.50-34.00
13 alloy (0.60 copper max.) 32.50-33.75
AXS-679 ..... 31.00-31.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 31.25-32.25
Grade 2—92-95% 30.25-31.25
Grade 3—90-92% 29.50-30.50
Grade 4—85-90% 29.00-29.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38⅛
Yellow brass	28⅞	26⅝
Red brass	34¼	33⅛
Comm. bronze	35⅝	35
Mang. bronze	27	25⅝
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 43½
No. 2 copper wire 42
Light copper 39½
*Refinery brass 39
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 44
No. 2 copper wire 41½
Light copper 39
No. 1 composition 35½
No. 1 comp. turnings 34½
Hvy. yellow brass solids 25
Brass pipe 29
Radiators 28

Aluminum

Mixed old cast ..... 21½—22
Mixed new clips ..... 22 —23
Mixed turnings, dry ..... 20½—22

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire 41½—42
No. 2 heavy copper and wire 38½—39
Light copper ..... 36 —36½
New type shell cuttings ..... 36 —36½
Auto radiators (unsweated) 24 —24½
No. 1 composition ..... 31½—32
No. 1 composition turnings 29½—30
Unlined red car boxes ..... 24½—25
Cocks and faucets ..... 24½—25
Clean heavy yellow brass ... 21 —21½
Brass pipe ..... 25½—26
New soft brass clippings .... 25½—26
No. 1 brass rod turnings .... 23½—24

Aluminum

Alum. pistons and struts .... 17 —17½
Aluminum crankcases ..... 16¾—17
1100 (2S) aluminum clippings 20½
Old sheet and utensils ..... 16¾—17
Borings and turnings ..... 11½—12
Industrial castings ..... 16¾—17
2024 (24s) clippings ..... 18½—19

Zinc

New zinc clippings ..... 8 — 8⅛
Old zinc ..... 5½— 6
Zinc routings 4
Old die cast scrap 3½

Nickel and Monel

Pure nickel clippings 51.25
Clean nickel turnings 51.00
Nickel anodes 51.25
Nickel rod ends 51.25
New Monel clippings 54½
Clean Monel turnings 44
Old sheet Monel 50
Nickel silver clippings, mixed. 23
Nickel silver turnings, mixed. 19

Lead

Soft scrap lead ..... 12 —12½
Battery plates (dry) ..... 6½— 6¾
Batteries, acid free 4¼

Magnesium

Segregated solids ..... 18½—19
Castings ..... 17½—18

Miscellaneous

Block tin ..... 81 —82
No. 1 pewter ..... 64 —65
Auto babbitt ..... 43 —44
Mixed common babbitt 15
Solder joints ..... 20 —20½
Siphon tops 47
Small foundry type 16½
Monotype 15
Lino. and stereotype ..... 14 —14½
Electrotype ..... 12 —12½
Hand picked type shells ..... 10½—11
Lino. and stereo. dross 6
Electro. dross 5

IRON AGE

STEEL PRICES

(Effective Jan. 3, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1 A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7 A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16,* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

STEEL PRICES

(Effective Jan. 3, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *18* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *A5, N4,R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S2*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S3*			

IRON AGE

STEEL PRICES

(Effective Jan. 3, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Centreville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5, W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5,J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W9*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	5.90 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10 F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Jan. 3, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle Pa
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City Ill
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Keppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal
P10 Precision Drawn Steel Co., Camden, N. J
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct.) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	7.00	+10.25	10.00	+6.25	12.50	+2.75	15.00	+1.50	15.50	+.50	16.00	0.00	17.50	0.25	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	11.50	.....	15.50	.....	17.50	.....	18.00	.....	18.50	.....	19.00	.....	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .32
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (A3, J2, L6) 10 pct	Plate (A3, J2, L6) 15 pct	Plate (A3, J2, L6) 20 pct	Sheet (I2) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.80	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
		Grain Oriented	
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7).
* Coils 75¢ higher

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1956 season.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.10
Mesabi, nonbessemer	10.95
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City R3	152	162		173	175	7.40	7.80
Aliquippa, Pa. J3	152	162				7.40	7.80
Atlanta A8	154	167		175	180	7.50	8.02¢
Bartonville K2*	154	168		175	181	7.50	8.07¢
Buffalo W6						7.40	7.80
Chicago, Ill. N4**	152	166		173	179	7.40	8.00
Cleveland A6	157					7.40	.....
Cleveland A5						7.40	
Crawfordsville M4*	154	167		175	175	7.50	8.05
Donora, Pa. A5	152	162		173	175	7.40	7.80
Duluth A5	152	162		173	175	7.40	7.80
Fairfield, Ala. T2	152	162		173	175	7.40	7.80
Galveston D4	157						
Houston S2	167	170			180	7.65	8.05
Johnstown, Pa. B3*	152	166			175	7.40	7.80
Joliet, Ill. A5	152	162		173	175	7.40	7.80
Kokomo, Ind. C9	154	154		175	177	7.50	7.90
Los Angeles B2*						8.35	8.92¢
Kansas City S2	167	174		178	180	7.65	8.05
Minnequa C6	157	167	162	178	180	7.65	8.05
Monessen P6	152	162				7.40	7.80
Moline, Ill. R3		162	162				
Pittsburg, Cal. C7	171	185			195	8.35	8.75
Portsmouth P7						7.40	
Rankin, Pa. A5	152	162			175	7.40	7.80
So. Chicago R3	152	162	157	173	175	7.40	7.80
S. San Francisco C6				197	195	8.35	8.75
Sparrows Pt. B3*	154			175	181	7.50	8.07¢
Struthers, O. Y1						7.40	7.80
Worcester A5	158					7.70	.....
Williamsport, Pa. S5			160				

Galvanized products computed with zinc at 5¢ per lb.
Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44-13.96	16.36	16.29-16.49
Birmingham	.15	6.89	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81-9.36	10.27	7.94-7.96	10.30	7.89	8.13	7.83	9.53	12.15-13.80	13.40-13.45	16.65	16.50
Buffalo	.30	6.80	7.90	9.70	7.15	.....	7.15	7.40	7.10	7.90	.....	13.10	.....	16.15
Chicago	.25	6.80	8.09	8.50	7.06	.....	6.99	7.28	7.08	7.75	13.20	12.85	16.05	15.90
Cincinnati	.25	6.92	8.33	8.90	7.30	.....	7.28	7.75	7.32	8.05	13.44	31.09	16.29	16.14
Cleveland	.30	6.80	8.09	8.85	7.16	.....	7.16	7.61	7.14	7.85	.....	12.91	.....	15.96
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.28	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.29	8.25	9.85-9.95	14.35	14.00	17.15	17.05
Kansas City	.28	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.30	8.05	10.70	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	6.89	8.18	8.59	7.15	.....	7.08	7.45	7.17	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	11.10	7.76	7.99	7.96	9.48	13.63	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.36-13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland		7.80-8.60	8.80-10.15	10.65	8.00	7.95	7.75	7.85-8.15	7.95	12.20	.....	15.60	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.00	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.09	8.38	9.19	7.35	.....	7.28	7.68	7.37	8.14	13.69	13.14	16.25	16.19
St. Paul	.25	7.46	8.59-9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.
* Plus analysis charge.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bristol, Conn., W12			10.80	12.95	15.65
Buffalo, N. Y. R7	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. S9		9.05	10.60	12.75	15.35
Cleveland A5	7.10	9.05	10.60	12.75	15.45
Detroit D1	7.20	9.15	10.70	12.85	
Detroit D2	7.20	9.15	10.70		
Harrison, N. J. C11			10.80	12.95	15.65
Indianapolis C5	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. B4	7.00	8.95	10.50	12.65	
New Haven, Conn. D1	7.55	9.35	10.90	13.05	
Pawtucket, R. I. N7	7.55	9.25	10.80	12.95	15.65
Pittsburgh S7	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. A1	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. S1	7.10	9.05	10.60	12.75	15.45
Trenton R4					
Wallingford W1	7.45	9.25	10.80	12.95	15.65
Warren, Ohio T4	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. W3	7.10	8.95	10.50		
Worcester, Mass. A5	7.65	9.35	10.90	13.05	15.75
Youngstown C5	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

(Effective Jan. 3, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825	....	....	....	....
So. Chicago *R3*	....	....	....	7.90	....	....	....
Ensley *T2*	4.725	5.65	....	....	....	....	....
Fairfield *T2*	....	5.65	....	7.90	....	5.625	....
Gary *U1*	4.725	5.65	....	....	....	5.625	....
Ind. Harbor *I3*	4.725	....	5.825	7.90	....	5.525	....
Ind. Harbor *Y1*	....	....	....	7.90	....	....	....
Johnstown *B3*	....	5.65	....	....	....	....	....
Joliet *U1*	....	5.65	5.825	....	....	....	....
Kansas City *S2*	....	....	....	7.90	....	....	....
Lackawanna *B3*	4.725	5.65	5.825	....	....	5.625	....
Minnequa *C6*	4.725	6.15	5.825	7.90	....	5.625	12.40
Pittsburgh *O1*	....	....	....	....	11.90	....	12.40
Pittsburgh *P5*	....	....	....	....	....	....	12.40
Pittsburgh *J3*	....	....	....	7.90	....	....	....
Seattle *B2*	....	....	....	8.40	....	5.775	12.90
Steelton *B3*	4.725	....	5.825	....	....	5.625	....
Struthers *Y1*	....	....	....	7.90	....	....	....
Torrance *C7*	....	....	....	....	....	....	....
Williamsport *S5*	....	5.65	....	....	....	5.775	....
Youngstown *R3*	....	....	....	7.90	....	....	....

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	25.75
Detroit, f.o.b.	26.25
New England, del'd	28.55
Seaboard, N. J., f.o.b.	25.50
Philadelphia, f.o.b.	25.00
Swedeland, Pa., f.o.b.	25.00
Plainesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	33.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	24.40
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
18 to 16	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.65
6	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb., frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb. lots	20.75
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	$1.70
Tin, ball anodes and elliptical $1.06 to	$1.10

Chemicals

(Cents per lb., fob shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	18.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums	21.55
(Philadelphia add .50 per lb)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

⅝" or smaller	64	66
¾" to 1½" inclusive	63	65
1¾" to 1⅝" inclusive	65	67
1⅞" and larger	61	63

C.P. Hex. regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	53	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount H.C. Heat
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34
9/16 and ⅝" x 6" and smaller and shorter	31
¾", ⅞", 1" x 6" and shorter	8
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49
9/16" and ⅝" diam. x 6" and shorter	43
¾", ⅞", 1" x 6" and shorter	31

20	
18	
+11	
41	
39	
30	

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Discount Mach. Screws	Stove Bolts
Packaged, package list	37	38
Bulk, bulk list		
Quantity		
¼-in. diam. & under, 35,000-200,000	30	61
5/16-in. diam. & larger, 15,000-100,000	30	61
All diam. over 3 in. long, 5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
Packaged, package list	24	27
Bulk, bulk list		
Quantity		
⅜-in. diam. & smaller, 25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.8
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Nov. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per 1000*
First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	135.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.38
Burned, Balt.	85.00

Magnesite Brick	
Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite	*St. ⅝-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	30.00
in sacks	46.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge, iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$2.60
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, ±80	$1.18
Silicon	43.50¢
Solder powder .7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.30
Zinc, 10 ton lots	18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Jan. 3, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.06% C	36.50	0.50% C	35.25
0.10% C	36.00	1.00% C	34.00
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.00% Si 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	28.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

5MZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.25
Clairton, Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$89.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	44.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn .. 22.35

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	35.55	36.75
0.07% max. C	30.95	33.50	34.70
0.15% max. C	29.45	32.00	33.20
0.30% max C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.30

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained 2 ..... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots 1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	[illegible]
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.10
Less ton lots	1.57

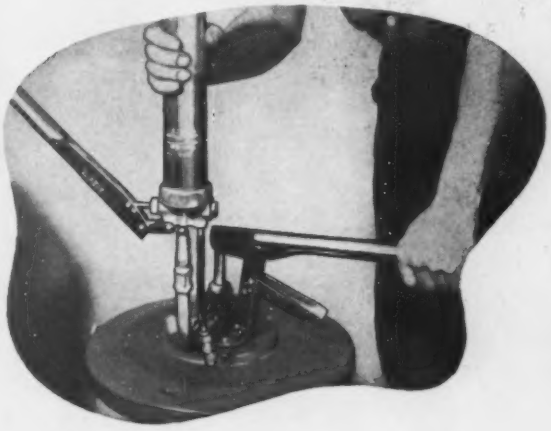
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

Silenz, contract basis, delivered.
Ton lots ..... 45.00¢

YOUR PRODUCTION GOES UP...

when you switch lubrication methods from

Backward to Forward!



ALEMITE HAND GUN WITH LOADER PUMP

reduces downtime... cuts man-hours

...saves right down the line!

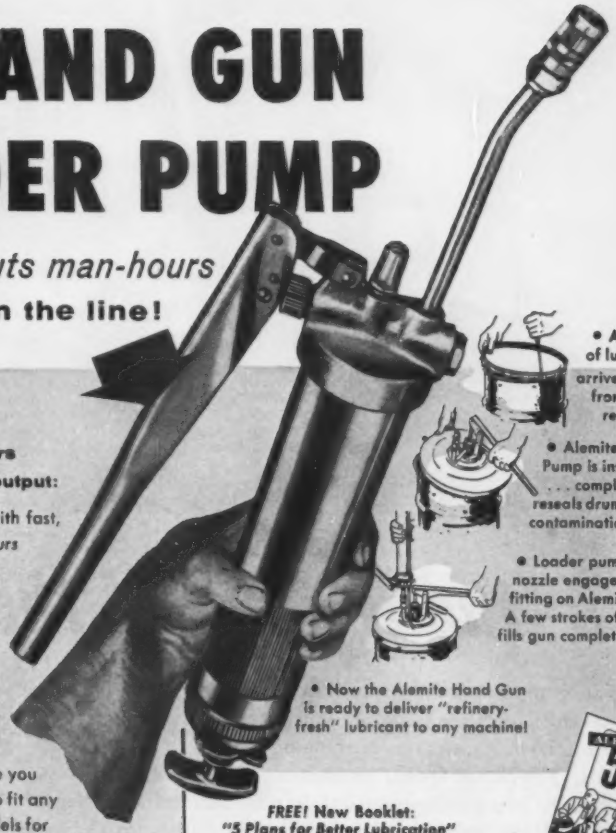
Why more and more plant managers look to Alemite lubrication for greater output:

Time studies prove it! Refilling hand grease guns with fast, efficient Alemite Loader Pumps saves you *15 man-hours* for every 400-pound drum of lubricant, compared with loading the old-fashioned hand-and-paddle way!

You eliminate the cost, mess and fire hazard of "oil-room" spillage. With Alemite equipment you can *transfer, load and apply* lubricant that you know is *completely* free of dirt, grit or abrasives. Machine-hours are saved, too! With better lubricated bearings, machines stay new longer!

Alemite can furnish a hand gun of correct capacity for your operation—from 8 ounces to 2 pounds. And you get the pressure you need—up to 15,000 pounds! There is an Alemite Loader Pump to fit any standard lubricant container you normally use—stationary models for 100-lb. and 400-lb. drums; portable models for 25-lb. and 35-lb. pails.

Ask your nearest Alemite supplier for full details.



- A drum of lubricant arrives—fresh from the refinery.
- Alemite Loader Pump is inserted . . . completely reseals drum against contamination.
- Loader pump nozzle engages fitting on Alemite gun. A few strokes of pump fills gun completely.
- Now the Alemite Hand Gun is ready to deliver "refinery-fresh" lubricant to any machine!

FREE! New Booklet:
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Company .....

Address .....

City ..... State .....

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REG. U. S. PAT. OFF.

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Mighty handy piece of materials handling equipment is this Towmotor Fork Lift Truck which high-stacks 3300-pound loads of sheet metal for a prominent steel fabricator—increasing storage capacity 70%.

the HIGH and the MIGHTY...

There are many steps required to turn raw materials into finished products and Towmotor Fork Lift Trucks are at home in receiving, processing, assembly, storage, or shipping jobs. By *Mass Handling* materials, Towmotor speeds production and distribution, cuts storage costs, strengthens *every link* in your chain of operations. For Certified Job Studies covering savings in your particular industry, write TOWMOTOR CORPORATION, Div. 1501, 1226 E. 152nd St., Cleveland 10, Ohio.

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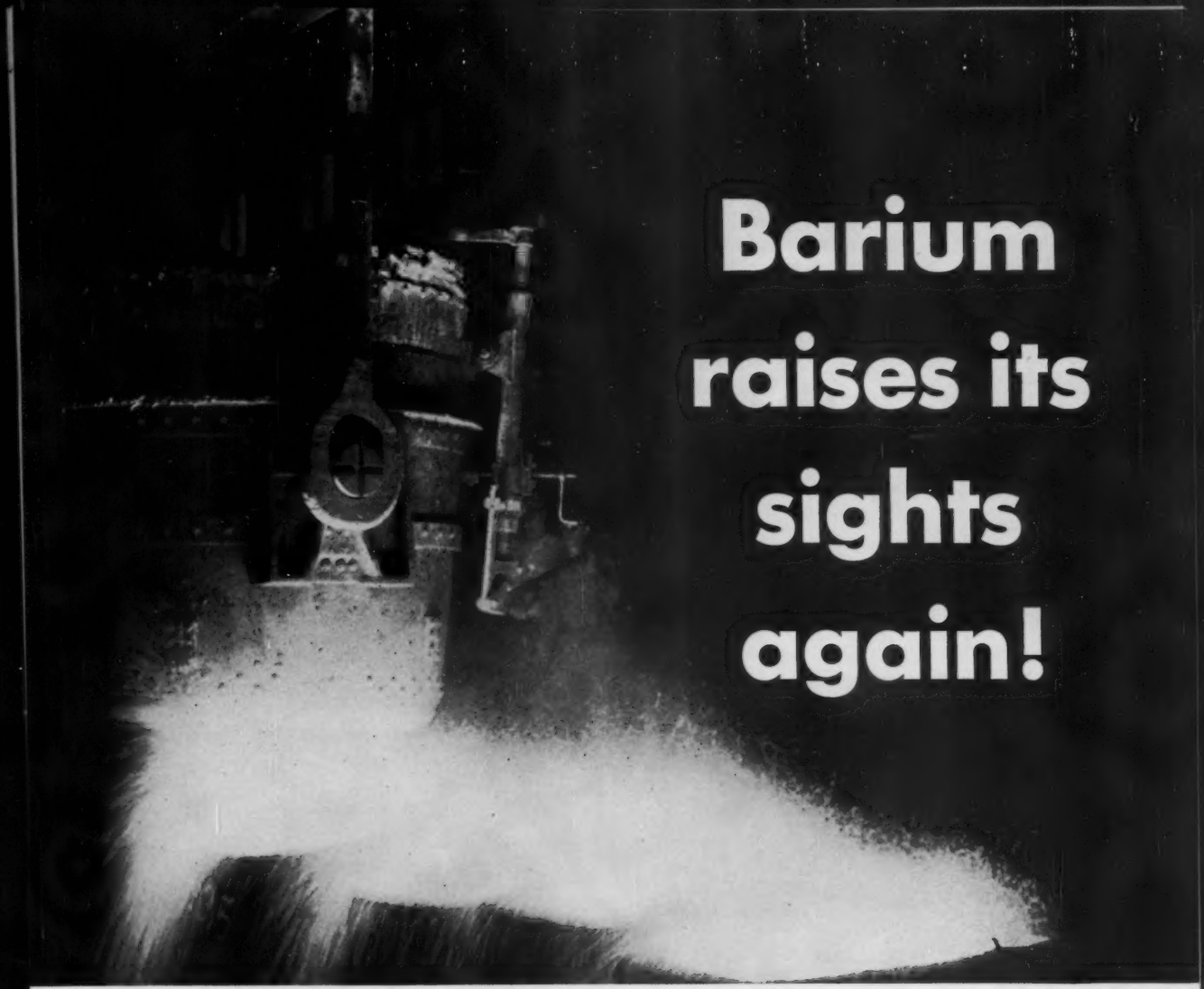


Barium raises its sights again!

Merger of steel operations to step up efficiency, increase customer service

Another milestone in Barium's long-term policy of planned integration was reached recently with the consolidation of all steel-making operations under the management of Barium subsidiary Phoenix Iron & Steel Company, Phoenixville, Pa.

Aimed at improving efficiencies still further and broadening Barium's customer service, the consolidation integrates Central Iron & Steel Company, Harrisburg, Pa. (now known as Plate Division), Chester Blast Furnace, Inc., Chester, Pa. (now known as Blast Furnace Division), Structural Division, Phoenixville, Pa. and Phoenix Steel Tube Division, Phoenixville, Pa. (Seamless Tubing), under the management of Phoenix Iron & Steel Company. All now function as Operating Divisions, and will remain in their present locations.

Barium believes this merger will produce a stronger and more flexible operation and set the stage for accelerated growth—not only of the divisions directly involved, but also of the entire Barium organization. For this move is a practical demonstration of the alert management thinking which has expanded Barium from one company to 14 in ten short years. Find out about Barium's soundly diversified family of companies. Write for "The Barium Story." Barium Steel Corporation, 25 Broad Street, N. Y. 4, N. Y.

5.5

STEEL PRODUCERS

Phoenix Iron & Steel Co. (Plate Div.; Structural Div.; Steel Tube Div.; Blast Furnace Div.).

STEEL FABRICATORS & PROCESSORS

Phoenix Bridge Company • Industrial Forge & Steel, Inc. Globe Forge, Inc. • The Geometric Stamping Company

MANUFACTURERS OF END PRODUCTS

Clyde Iron Works, Inc. • Erie Bolt & Nut Company Bayonne Bolt Corporation • The Cuyahoga Spring Company • Jacobs Aircraft Engine Company • Kermath Manufacturing Company • Kermath (Canada) Limited Wiley Manufacturing Company.

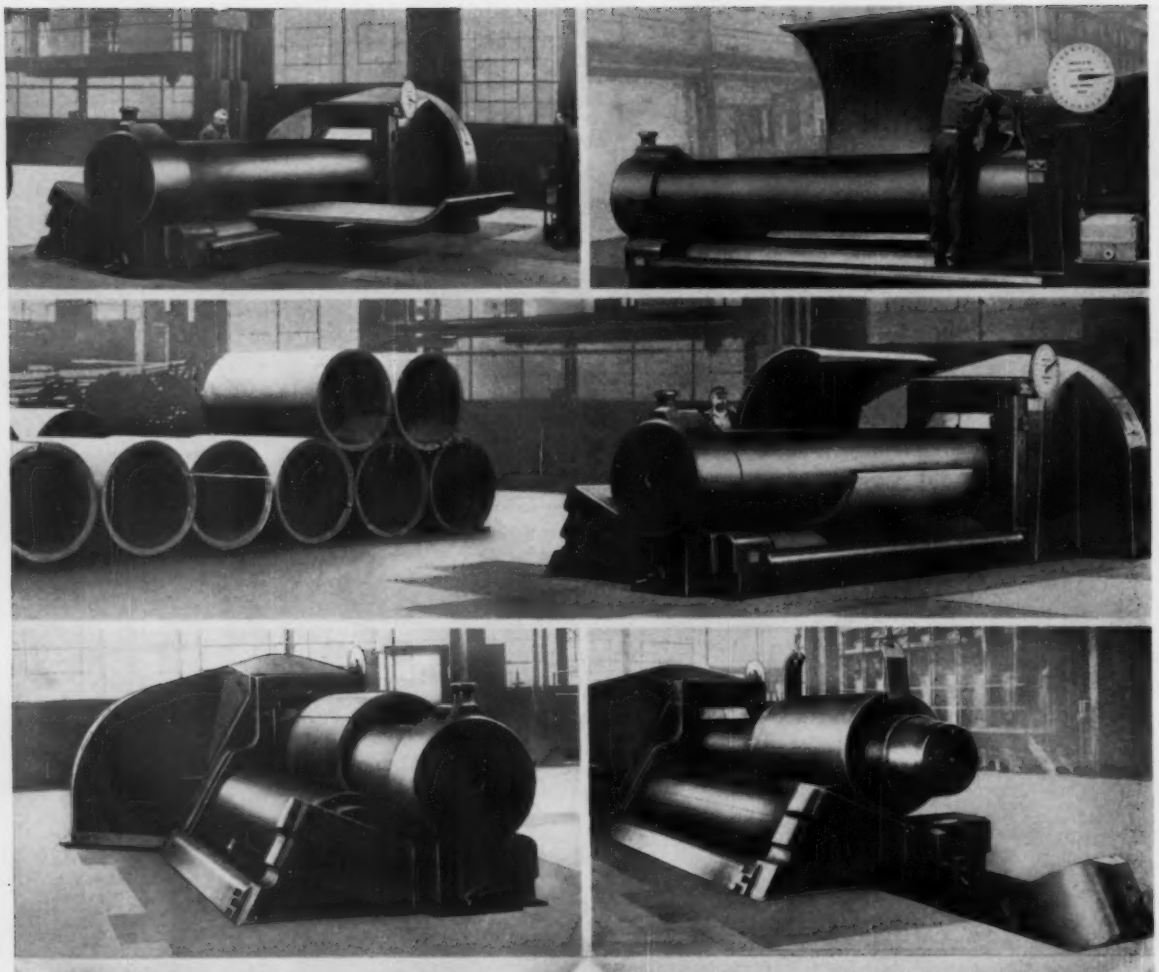
LIGHTWEIGHT METAL AND PLASTICS

East Coast Aeronautics, Inc.

14 INTEGRATED COMPANIES

BARIUM STEEL CORPORATION

WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS



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INITIAL PINCH TYPE

Rolling A-212 Plates Cold
3" Thick to 38" I.D.

BERTSCH & COMPANY

CAMBRIDGE CITY INDIANA

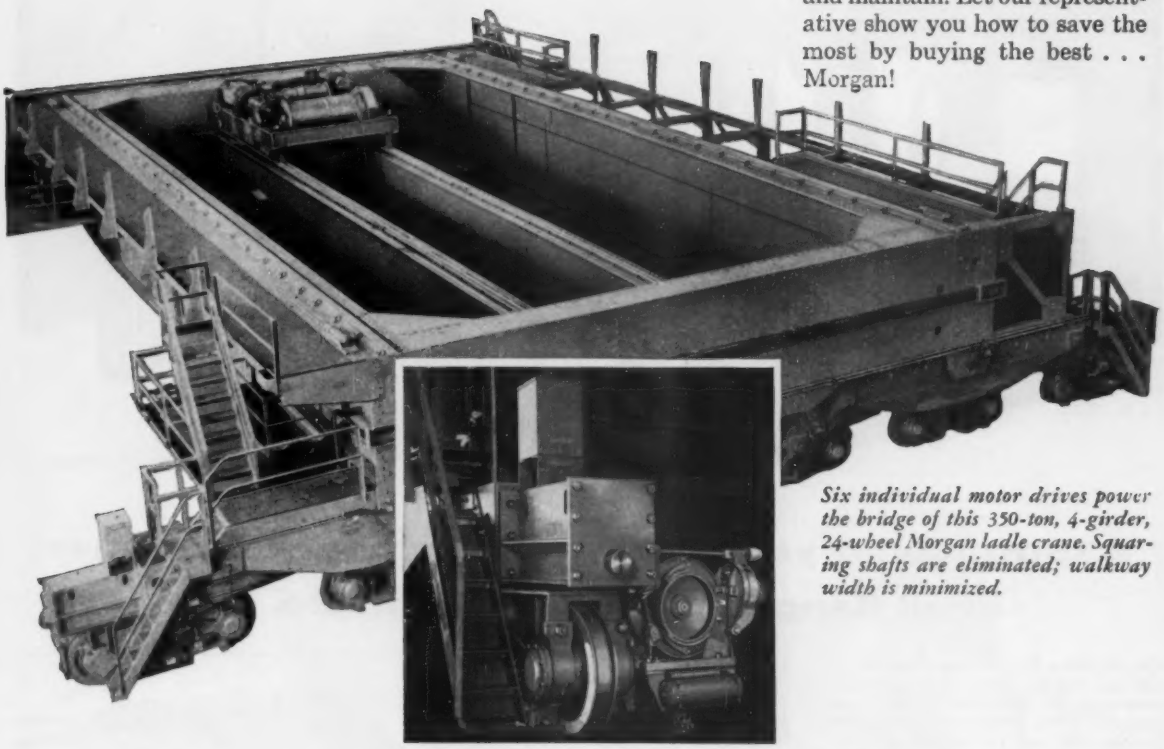
Advertisers in the Iron Age since 1879

How Morgan "points the way" to smoother crane operation

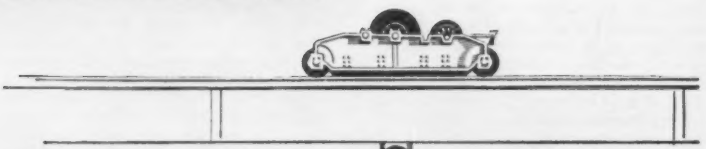
● INDIVIDUAL MOTOR DRIVES were pioneered by The Morgan Engineering Company to improve crane bridge travel . . . to provide smoother operation, to reduce the number of moving parts, to simplify maintenance, to eliminate dead weight of drive shafts, to streamline the crane.

These individual motor drives are another vital link in the chain of features that make Morgan cranes the best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Six individual motor drives power the bridge of this 350-ton, 4-girder, 24-wheel Morgan ladle crane. Squaring shafts are eliminated; walkway width is minimized.

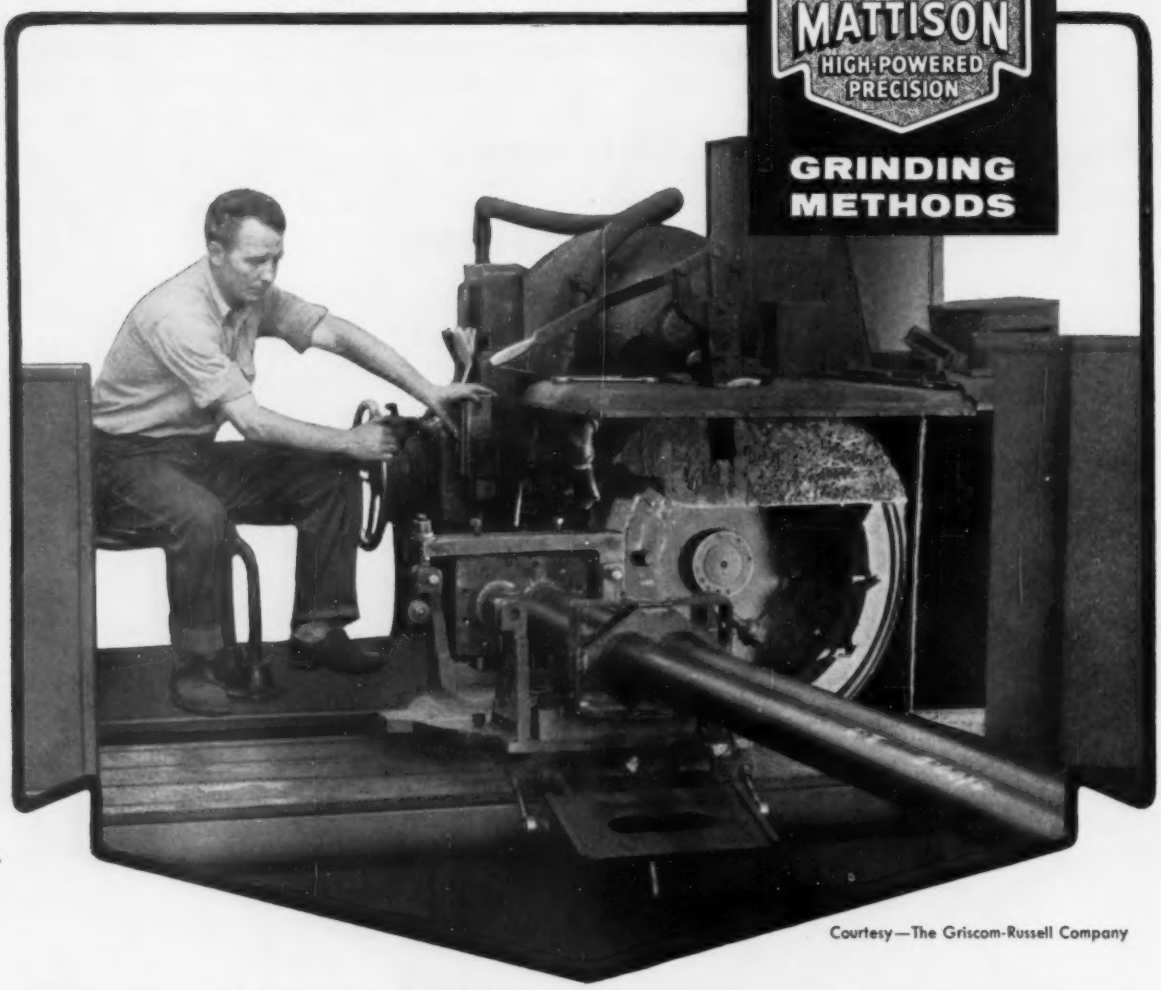


THE MORGAN ENGINEERING CO. *Alliance, Ohio*

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

CASE HISTORY NO. 14—SHELL FLANGES

MATTISON
HIGH-POWERED PRECISION
GRINDING METHODS



Courtesy—The Griscom-Russell Company

$3500 saved yearly by grinding heat exchanger shell flanges on the Mattison No. 500

One Mattison No. 500 Traveling Wheel Grinder and one operator turn out 300 pieceparts per week (two shifts) on an operation that formerly required two boring mills and two operators in the plant of a producer of heat transfer equipment. Shell and flange gasket surfaces of a twin G-fin section are ground on this machine.

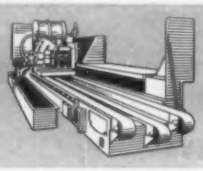
The twin G-fin section is a simple form of heat exchanger, consisting of an inner pipe which is the G-fin element and an outer pipe which serves as the shell.

To prevent leakage and secure a gasket-fit, the surface of the shell flange (carbon steel) and the shell cover (cast or forged steel) both measuring approximately 9 x 12 in., are ground to a 65 to 70 micro inch finish. Stock removal is approximately .0625 in. Flatness is held to within .003 in. and the surface slightly roughened.

Mattison Traveling Wheel Grinders offer an excellent solution to the problem of grinding long and bulky pieces. The part, no matter how large, is clamped in a stationary position and the grinding wheel passes over the surface. Floor space required is only half that needed for a traveling table machine. Send for descriptive Bulletin No. 844.

A close-up of shell covers showing the finish produced by grinding on the Mattison No. 500 Traveling Wheel Grinder.

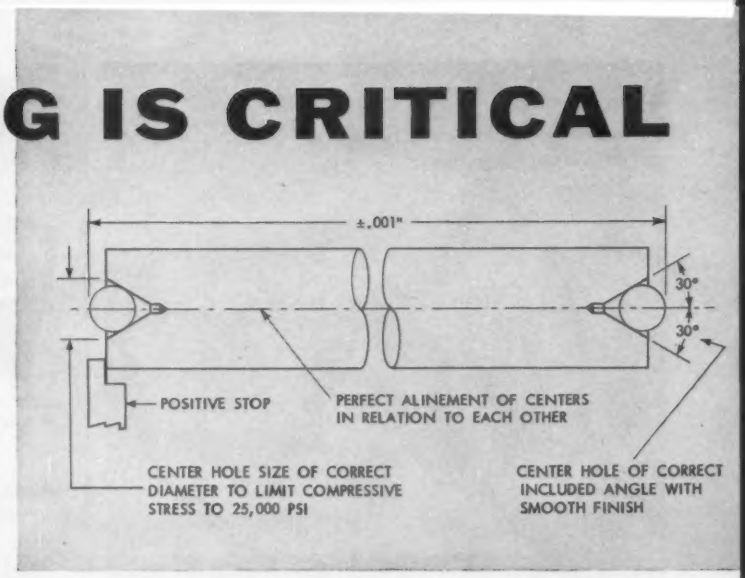
MATTISON
MACHINE WORKS
ROCKFORD ILL. U.S.A.



HIGH-POWERED
PRECISION
SURFACE
GRINDERS

CENTERING IS CRITICAL

FOR TRACER AND AUTOMATIC LATHE PRODUCTION


±.001"
30°
30°
POSITIVE STOP
PERFECT ALINEMENT OF CENTERS IN RELATION TO EACH OTHER
CENTER HOLE SIZE OF CORRECT DIAMETER TO LIMIT COMPRESSIVE STRESS TO 25,000 PSI
CENTER HOLE OF CORRECT INCLUDED ANGLE WITH SMOOTH FINISH

The above sketch graphically highlights the centering "musts" for work to be automatically machined between centers.

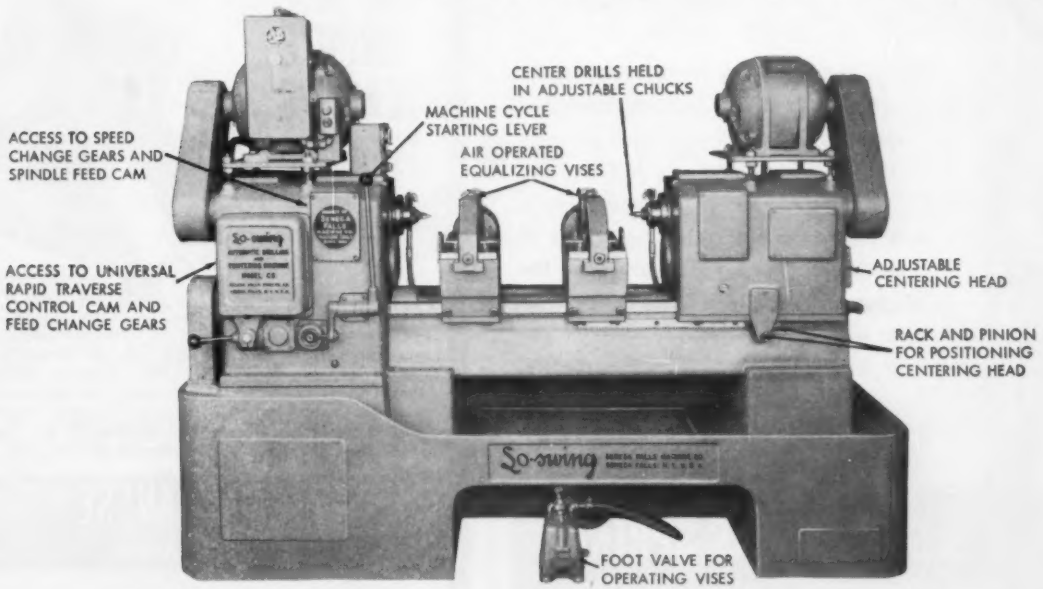
Model CS Lo-swing Automatic Drilling and Centering Machine has the inbuilt features to provide all these requisites. It is designed for accurate centering on a continuous, high production basis, yet can be quickly and easily "changed-over" for short run jobs. Its 100% mechanical system provides positive, independent control of rapid traverse movements and drilling feeds. It has a fully automatic cycle and can be completely automated in a production line.

Write for your copy of Bulletin CS-54 which tells the whole story.

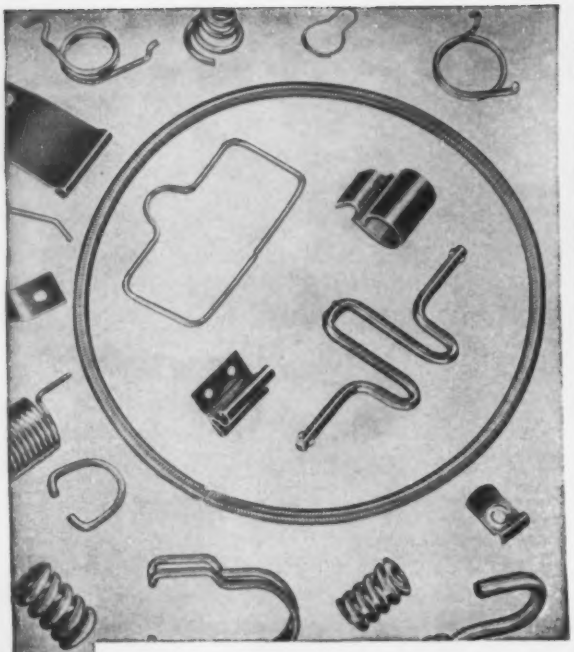
THIS IS WHAT MODEL CS WILL DO TO CUT COSTS ON TRACER AND AUTOMATIC LATHE PRODUCTION

- provide positive control of center depth to ± .001".
- accurately locate work piece to assure correct center depth at *both* ends.
- guarantee correct angle and perfect alinement of center holes.
- produce a smooth, cleanly-finished center hole capable of positive contact with the surface of the center. This is accomplished by a unique design of the feed cam which withdraws the center drill near the end of the feed stroke to clear chips . . . and then feeds a few thousandths at reduced rate for a final finish cut.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.


CENTER DRILLS HELD IN ADJUSTABLE CHUCKS
MACHINE CYCLE STARTING LEVER
AIR OPERATED EQUALIZING VISES
ACCESS TO SPEED CHANGE GEARS AND SPINDLE FEED CAM
ACCESS TO UNIVERSAL RAPID TRAVERSE CONTROL CAM AND FEED CHANGE GEARS
ADJUSTABLE CENTERING HEAD
RACK AND PINION FOR POSITIONING CENTERING HEAD
FOOT VALVE FOR OPERATING VISES

Lo-swing MODEL CS AUTOMATIC CENTERING MACHINE



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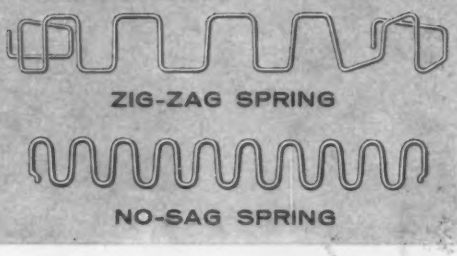

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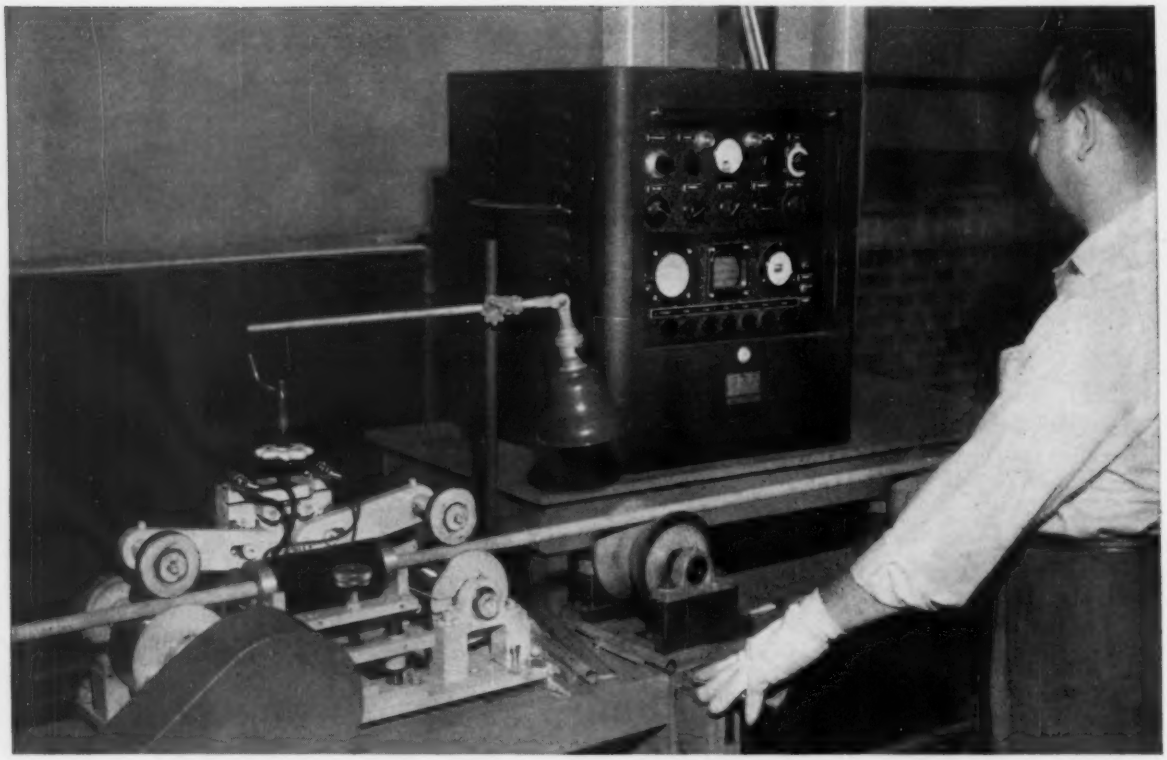

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Ask your Carpenter Representative or local Carpenter Distributor for more details about this new quality control measure. Specify Non-Destructive Test on your inquiries and orders.

MEMBER

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Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

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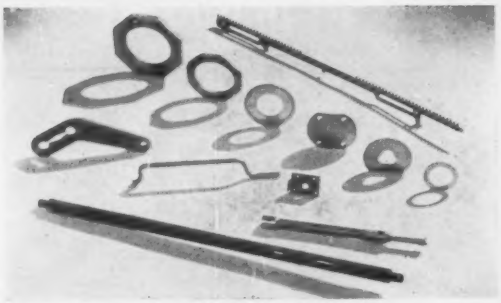

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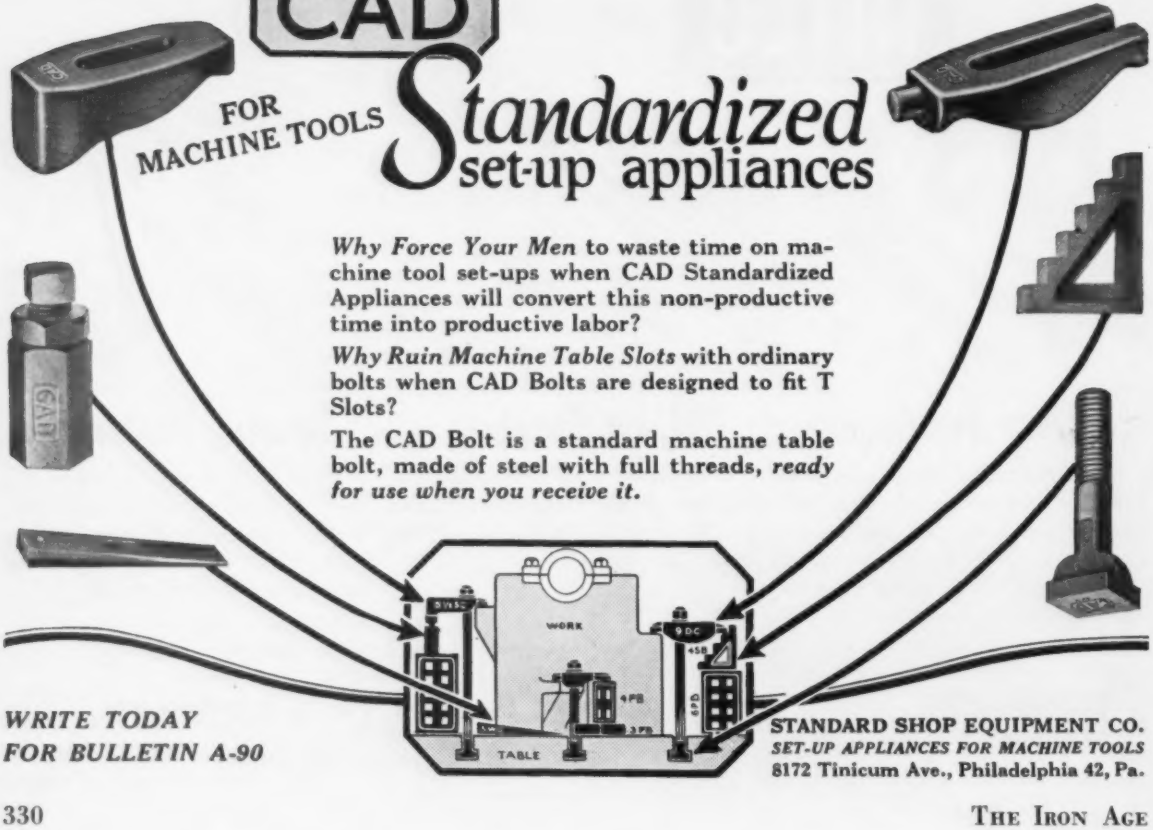

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News of Used and Rebuilt Machinery

Coast Dealers Bullish . . . West Coast used machinery dealers see a good year ahead. An IRON AGE survey in Los Angeles, San Francisco, and Seattle finds optimism running high. In busy, booming Los Angeles, dealers look for a big volume of heavy machinery business in 1956. Trend: more customer demand for specialized equipment. Behind this is the growing complexity of aircraft manufacturing, and steady, strong activity in steel fabricating.

Dealers agree these items will be the best sellers: Big engine lathes, in the 20 in. to 26 in. range, with some calls for 36-in. models. Bed requirements will be in the 10 ft to 15 ft range. This equipment is now in demand from manufacturers of tanks, boilers, and materials handling equipment.

Also on the list of good movers: surface grinders, drill presses, vertical mills. However, turret lathes and automatics — equipment for volume production plants — won't be getting many calls.

Big Planer, Shaper Demand . . . Aircraft manufacturing, getting more and more complex all the time, is hot for planers and shapers for conversion to profiling and tracing machines. This equipment, in good demand all through 1955, will be very fast-moving in the new year. Dealers are finding it pays to pick up planers and shapers in the East and ship them to the West Coast for conversion.

Look for sheet metal equipment to sell well in the Los Angeles area. Rapidly expanding electronics manufacturing firms are grabbing up these tools.

All in all, the stuff that will move best will be late-model machines—models dated in the 1950's —in good condition. Older tools just won't sell because they simply can't do the close-tolerance, high-speed work needed today.

Dealers aren't worried much about supplies. They claim companies are pushing their used equipment on the market because plant storage space is at a premium.

How About San Francisco? . . . How's the 1956 picture look to San Francisco Bay Area dealers? One concern, generally on the conservative side, said, "about the same as 1955." Another predicted a 50 pct hike!

Good machinery continues to move best in the Bay Area. Horizontal boring mills and lathes are standout movers. Although one firm says supply of everything is adequate, another says there's not too much around of the equipment in big demand. Prices are holding firm, and for some items unusually well.

A recent auction brought as much for some machinery 10 to 15 years old as the equipment cost originally.

Seattle Dealers Optimistic . . . Industry sources in Seattle are "very optimistic" about the used machine tool outlook for 1956. They cite an increasing trend towards newer, higher-speed equipment.

Said one industry representative: "The newer machines are making the old ones obsolete rapidly. Everything's moving in the direction of automation."

Because of the high cost of skilled labor in the Seattle area, there is a relatively greater need to increase productivity through speedier work and thereby lower labor costs.

Most light machine tool equipment is in good supply now, with delivery in from three to four weeks. However, some lines are in almost critical supply: milling machines are from nine to twelve months on backorder; brakes, shears, and boring mills from three to six months.

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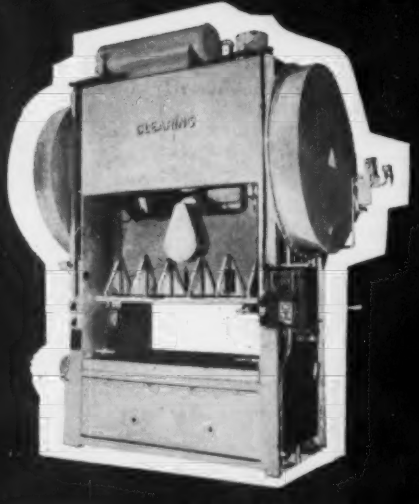

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CONTRACTOR EQUIPT. & MACHINERY

THE PURDY CO,
8754 S. DOBSON AVE.
CHICAGO 19, ILL. — BA 1-2100
ALSO ST. LOUIS, MO.—SAN FRAN., AND LONG BEACH, CALIF.

MOTOR GENERATOR SETS

KW	MAKE	A.C.	D.C.
1000	G.E.	13200	600
500	Westg.	2300	250
400	Al.-Ch.	2300	120/240
400	G.E.	2300	270
300	G.E.	2300	250
200	G.E.	2300	250/275
200	Westg.	4160/2200	275
200	Ridgeway	2300	250
170	G.E.	440	125
150	Al.-Ch.	2300	275
150	Westg.	2300	125/150
150	G.E.	440	275
100	G.E.	2300	250
100	Westg.	440	125
100	G.E.	440	125
75	Al.-Ch.	440	250
75	G.E.	440	125

CHICAGO ELECTRIC CO.
1335 W. Cermak Rd., Chicago 8, Ill.

LOCOMOTIVES
1—35 Ton Porter Diesel Elec.
1—30 Ton Davenport Gasoline
1—10 Ton Whitcomb Diesel

CRANES
25 Ton Amer. Diesel Loco Crane
10 Ton OET 20 ft Span 230 V. D.C.

MODERN AIR COMPRESSORS
686 C. F. M. Gardner Denver W J B—125 HP
686 C. F. M. Inger. Rand 14x13—ESI
20515 C. F. M. Inger. Rand 40 T—100 HP

STEEL SHEET PILING
3800 Tons Carnegie MP 112—30' to 40'
600 Tons Carnegie MP 116 & MP 115—30' & 40'

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60 E. 42nd St., N. Y. 17, N. Y.

BAR SHEARS—OPEN END
NO. 55 BUFFALO MILL TYPE
Cap. 3"—LATE

No. 4 R. & M., 4½" Square
13" Knives

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LANG MACHINERY COMPANY
28th St. & A.V.R.R. Pittsburgh 22, Pa.

Immediate Delivery
Used Swindell-Dressler
ELECTRIC ARC FURNACE
With Transformers, Switchgear, Controls, Etc.
11' 6" Shell Diam. Melting Rate 6 Ton Per Hour

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#1 & #2 Buffalo Forge Vertical Bending Rolls. Leg-in Attachment. Late Type.
#½ & #1½ Buffalo Universal Ironworker. Coper, Notcher. Late Type.

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16 Ward St. Baker 5887 Rochester 5, N. Y.

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2300	1190
1	700	A.C.		2300	500
1	500	G.E.	MT-412	2300	580
1	500	Whse.	CW	550	350
1	500	G.E.	M-569Z	2200	1180
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2200/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-556B	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	CW	2300	435
1	125	A.C.		440	885
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
1	500	G.E.	K-6345-B	2300	1185
2	450	Whse.	CS-1420	2300/4150	354
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CS-876C-TEFC	440	710

SYNCHRONOUS

2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2200/12000	600
1	500	Ideal	SM	2300/4160	1800
2	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7565	2200	1200
1	400	G.E.	TS	2200	400

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

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eastern Rebuilt Machine Tools
THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

ENGINE LATHES

24" Schumacher & Boye Loose Change, raised to swing 33" x 24' bed, cone, motorized
24"x12' LeBlond Geared Head, m.d. taper
24"x12' bed Boye & Emmes, belt drive
24" raised to swing 32"x22" bed—16" centers New Haven, cone, taper
25"x10' bed LeBlond Geared Head, m.d., taper
30" raised to swing 44"x15' bed American Geared Head, m.d.
30"x12'6" bed Niles-Bement-Pond variable speed, m.d., taper
30"x18' bed American High Duty Geared Head, m.d., taper
36"x84" centers American "Super-Productive," m.d.
36"x18' centers Lodge & Shipley Geared Head, m.d.
36"x18' bed Putnam Geared Head, m.d.
38"x17' centers American Super-Productive Geared Head, m.d.
40" raised to 48½x108" centers LeBlond, m.d.
42" Monarch NN Geared Head, m.d., late
42"x14' bed American Geared Head, m.d.
42" Putnam raised to swing 56½x20' bed Geared Head, m.d., 11'8" centers
42"x46' centers, 54' bed, American Geared Head, m.d.
48"x33' centers Niles-Bement-Pond, m.d.
63"x7' centers I. H. Johnson, m.d.
60" raised to swing 90" over bed x 68' centers Niles-Bement-Pond, m.d.

MANUFACTURING LATHES

12x33", 20x25" Jones & Lamson Fay Automatic Lathes, 1944
12x18" Reid Small Piece Production Lathe, Model 6WSL, m.d.
No. 3 Lodge & Shipley Duomatic, m.d., late type
No. 3A Lodge & Shipley Duomatic, m.d., late type
No. 3 Niles-Bement-Pond Axle Lathe, m.d.
W. C. Lipe Carbo-Semi-Automatic, m.d., late
No. 4 LeBlond Boring Lathe, 37' bed, 4" hole, m.d., latest
No. 9, 12 LeBlond Multi-Cut, m.d.
4x60" LoSwing, m.d.
8x132" LoSwing, m.d., latest
9x12" Sundstrand, s.p.d.
11x18" LeBlond Rapid Production, m.d.
12x18" centers Monarch Model 5T, m.d.
No. 12 Gisholt Semi-Special Automatic Production, m.d.
No. 9WSL, 18x22" Reid Production Lathe

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

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1002 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1241 **CABLE ADDRESS—EMCO**

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New **RAILS** *Relaying*

TRACKWORK of all KINDS
LIGHT RAILS—12# TO 60#—20'0" & 30'0"
HEAVY RAILS—60# TO 100#—30'0" & 33'0"
JOINT BARS, BOLTS, TIE PLATES, SPIKES & TOOLS, FROGS, SWITCHES, STANDARD & SPECIAL TRACKWORK.

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STEEL
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STRUCTURALS
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Save on Your INDUSTRIAL TRACK

FOSTER QUALITY — FULLY GUARANTEED

RELAYING RAILS

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

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RAILS - TRACK EQUIPMENT - PIPE - PILING
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PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
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MARAIL-EQ

Keep 'em rolling . . . not rusting

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New—Used—Reconditioned railroad freight cars • car parts • locomotives • tank cars • steel storage tanks.

MARSHALL RAILWAY EQUIPMENT
Corporation
50 Church St., New York 7, N. Y. COrtlandt 7-8090
Cable MARAILQUIP

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Approximately 100 net tons ¼" high carbon steel wire, bright basic, M.B., oil tempered, manufactured in accordance with A.S.T.M. specification A-229-41, in coils of approximately 600 lbs. each, with inside diameter of approximately 28", located at our Wharton, N. J., plant. Price $230 per net ton, F.O.B. cars Wharton, N. J., subject to prior sale. If interested in all or any part, wire or write to Lock Joint Pipe Co. Att.: Mr. D. Linehan, 150 Rutledge Ave., East Orange, N. J. Phone ORange 5-8900.

RAILS
FOR IMMEDIATE DELIVERY

500 Tons 80# ASCE	Relay
400 Tons 90# ARA-B	Relay
150 Tons 90# ASCE	Relay

TIE PLATES • Excellent Relay TURNOUTS—LIGHT RAILS TRACK ACCESSORIES

MORRISON
RAILWAY SUPPLY CORP.
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New **RAILS** *Relaying*

We carry frogs, switches, spikes and bolts in stock and meet all sections of rails and track accessories.

M. K. FRANK
480 Lexington Ave., New York, N. Y.
Park Building, Pittsburgh, Pa.
105 Lake St., Reno, Nevada

Natco Nos. G5 & C12 Multiple Drills.
Van Norman No. 3S Plain Mills.
Bliss No. 23 Coining Press, 1944.
Jarecki Type BB Screw Press, 80 ton.

D. E. DONY MACHINERY CO.
4357 St. Paul Blvd. Rochester 17, N. Y.

WE BUY AND SELL USED OVERHEAD TRAVELING CRANES STRUCTURAL BUILDINGS

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BENKART STEEL & SUPPLY CO.
CORAOPOLIS, PA.

Find that machine you are looking for in the
CLEARING HOUSE

IMMEDIATE SHIPMENT

2—500 KW General Electric Synchronous Motor Generator Sets

Generators: type MPC, 240 Volts D.C. 900 RPM, 40 degree

Synchronous Motors: 725 HP, 830 KVA, 3 PH 60 Cycle 2200 Volts. Equipment: D.C. Panels and C R 7069Y1

Synchronous Motor Panels

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A.C. & D.C.
MOTORS AND GENERATORS
One of America's Largest Stocks
RELIABLY REBUILT
IN OUR OWN SHOP
1 YEAR GUARANTEE
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FOR SALE

10—Koppel and Western 30 cu. yd. Air Dump Cars. Lift type doors with side aprons. All steel. Bargain.

80 ton General Electric diesel electric locomotive 500 HP Cummins engines. Built 1947.

80 ton Whitcomb diesel electric locomotive 500 HP Cummins engines. Rebuilt.

44 ton General Electric diesel electric locomotive 380 HP Caterpillar engs. 4 motor type.

Mississippi Valley Equipment Co.
501 Locust St. St. Louis 1, Mo.

IMMEDIATE DELIVERY

FERRACUTE SD-703 Double Action Toggle Draw Press 700 Ton Cap., Bed Area 60" F.B. x 72" L.R., Stroke of Plunger 40", Stroke of Blank-holder 20", 100 H.P. Motor.
BLISS No. 88 Straight Side Single Crank Press; Capacity 255 tons, Bed Area 30" & 29", 18" Stroke of Slide, Marquette Air Cushion.
TOLEDO Double Cranks, Nos. 91-42, 92C.
CLEVELAND Double Cranks, 65-G-72, 45-D-60.
NIAGARA Double Cranks, 67C, 69BX.
BLISS Nos. 4, 22K, and 24K Knuckle Joint Presses.

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NATIONAL MACHINERY EXCHANGE
128 Mott St. New York 13, N. Y.
CAnal 6-2470

Overhead Cranes & Hoists

NEW & USED

10-ton Case Crane, 56' 11" span, 3-motor, 220/3/60, floor controlled, pendant type, box girders, excellent condition—inspection under power—sacrifice price for immediate sale before storing same.

Available 100 cranes various spans, tonnages and current.

JAMES P. ARMEL — Crane Specialist
710 House Bldg. Pittsburgh, Pa.
Tele: Gr. 1-4449

1½" Ajax Upsetting & Forg. Machine, air clutch, latest type, built 1949

4" National Upsetter High Duty, guided over-arm slide, air clutch

Ajax & National Upsetters, suspended slide, 1", 1½", 2", 3", 4"; similar upsetters not suspended slides

700-ton Ajax High Speed Forging Press

500-ton National Maxipres

Kling No. 6 Bar & Billet Shear, 6" rd.

Hilles & Jones and Buffalo Shears 1½", 2", 2½", 3", 3¼", 4" and 4¼"

1600 & 2500# Chambersburg Model F Board Drop Hammers, Roller bearing; double V-ways. Built 1943

4000# Niles Bement Double Frame Steam Forg. Hammer

Bradley Hammers, all sizes, including 500# Upright

Nazel Air Forging Hammers, #2-B, 4-B, 5-N

Williams White Bulldozers, #22, #3, #4, #25, #6, #29 U-type

300-ton Oilgear High Speed Hydraulic Press, Ram 27" x 23"

Landis Landmaco and other Landis Threading Machines from ⅜ to 4"

Single and Double End Punches

Multiple Punches

Plate Shears

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

DONAHUE STEEL PRODUCTS CO.
1913 W. 74th Street, Chicago 36, Ill.

SELECT MACHINE TOOLS

GRINDING MACHINES
72" Hanchett 3-spd. rotary surface, new 1946.
10" x 90" Landis gap type cylindrical, new 1941.
13" x 60" Model 300 Hanchett vert. spdl., late.

HAMMERS
No. 6-1 Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES
18"/38" x 60" sc Nobel gap lathe, 1941.
20" x 67" Axelson H.D. engine lathe, late.
24" x 8' LeBlond H.D. engine lathe.
14" x 6' Hendey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.

MILLS
M-24 Kearney & Trecker Mfg. Mill
1-18 Cincinnati production.
2-16 Cincinnati production, late model.
Model 2-20 Kent-Owens hyd. mill, late (2).
60" x 48"x 16' Ingersoll adj., rail planer type.
No. 3H K & T plain horiz., new 1942.

PLANERS
36" Rockford Hyd. Openside Shaper-Planer.
48" x 48" x 10' Gray Maxi-Service.

PRESSES
90 ton No. 92½C Toledo D.C. Str. Side.
200 ton No. 700½-72 Toledo D.C. Toggle drawing.
500 ton No. 1000 Hamilton D.C. adj. bed, 60" x 102".
545 ton No. H3612½ Hamilton Forging Press.

SHAPERS
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D., late type.

SHEARS
50"x3/16" Bertsch power squaring shear, 18" gap.
96" x 10 GA Bliss power squaring shear.

UPSETTERS
3½" Ajax, suspended slides, steel frame.
5" Ajax suspended slides, steel frames, air clutch.
1½" National Upsetter, guided ram, hard ways.
2" National Upsetter, guided ram, air clutch.

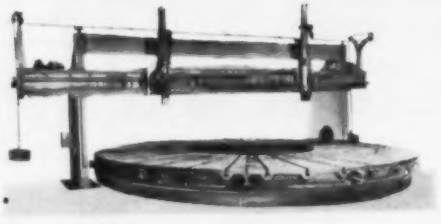
1000 Tools in Stock
Free Illustrated Catalog

MILES MACHINERY CO.
Phone Saginaw 2-3105
2041 E Genesee Ave. Saginaw, Mich.

HEAVY UNUSUAL MACHINES

36 Foot Vert. Boring Mill 75HP, 6/1 var. spd. motor and controls.

Design And Construction Lends Itself To Provide An Independently Driven Higher Speed 14' Table.



48" x 85' Niles B. Pond double anti-friction head; arranged to receive boring and trepanning attach.

MACHINE TOOL SALES COMPANY, INC.
36 South Delaware Ave. Philadelphia 6, Penna.
WAlnut 2-1120

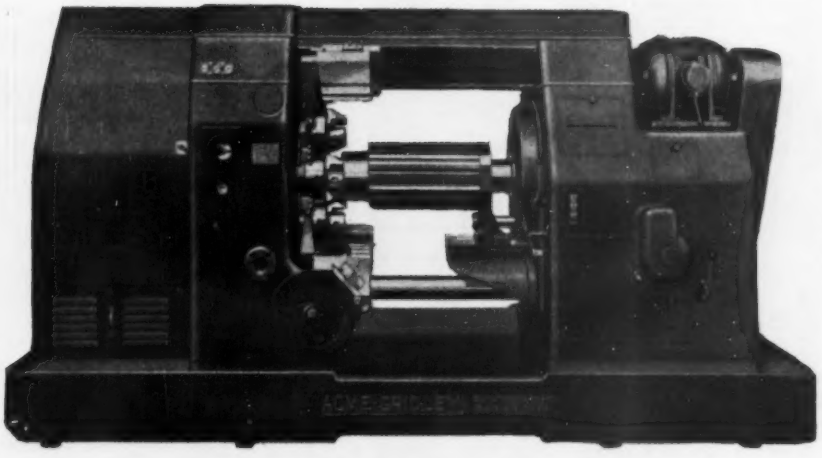
Want to clean house?
Use The Clearing House

35/5 TON "SHAW" GANTRY CRANE

50' Span 22' Lift, 11/36/100/100/FPM
3/60/440 Motors 35/15/15/35 HP
Cab Control, excellent condition, can be inspected in operation. Very Reasonable
S. M. DAVIS 510 LaSalle St. St. Louis 4, Mo.

EMERMAN OFFERS FROM STOCK

FOR SALE . . . FOR RENT



6" 8-SPINDLE MODEL RPL ACME GRIDLEY CHUCKING MACHINE

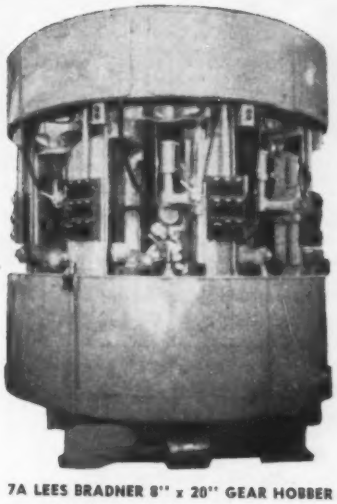
Serial No. 89011—1947

Nominal O.D. of chuck 6"
Max. swing 6"
Length of turning 6"
Range of spindle speeds 71 to 580 RPM
Cross of slide travel 6"
Tool slide travel 6"
Equipped with:
Coolant pump
Change gears
Double index
2 cross slide tool holders
20 HP 220-440 volt drive motor
Complete electrical panel

36-72 CINCINNATI HORIZONTAL HYDROTEL MILLING MACHINE

Serial No. 42M360576-15—New in 1942

Table working surface 36" x 93"
Range: Longitudinal 72"
Vertical 48"
Cross 18"
Spindle Speeds: (16) 12 to 720 RPM
Infinite Number of feed rates, .6 to 15"/min.
Spindle Drive Motor: 10 HP 3/60/220-440 V/1150 RPM
Table Motor: 7½ HP, 3/60/220-440 V/1160 RPM
Approx. weight 50,000 lbs.



7A LEES BRADNER 8" x 20" GEAR HOBBER

Serial No. 7A-360-7A-367—1947

Rated capacity in steel 4DP
Max. diam. capacity with 3" hob 8"
Max. diam. capacity with 4" hob 7"
Travel (max. face width) 21"
Capacity: Nose W/S to T/S center 25"
Max. Helix angle R or L Hand 45"
Taper in nose of work spindle #14 B & S
Hob arbor diam. 1¼"
Max. hob diam. 4"
Max. hob length 4"
Axial shift of hob 2"
Equipped with:
Hob shifters
Meters and electrical equipment

4'9" Cinn.-Bickford Super Service Radial, Ser. #1R2735, New 1944
4" Sellers Horizontal Table Type Boring Mill, Serial No. 04-1317, New 1942. Over Size Machine. Type A Barber Colman Gear Hobber, Extended bed. Power Down Feed, Serial No. 1363. New 1942
40-Ton LaPointe, Model SRV, Vert. Surface Broach, 66" Stroke, Ser. #43141, New 1943
330T Giddings and Lewis Boring Mill, Ser. 6041, Complete electrics.
#24 Gleason Straight Bevel Gear Generator, 33½" Dia., Ser. #17916, New 1942
20" x 72" Cinn. Plain Cyl. Grinder, Filmatic Bearings, 84" Centers, Ser. #7B6F1Y-2, New 1952
24½" x 28' Monarch Engine Lathe, 2 Carriages, 2 Taper Attachs., Rap. Trav., Ser. #6806, New 1940
#22B Bardons & Oliver Saddle Type Turret Lathe, 4½" Hyd. Bar Feed, Hyd. Pre-Selector Head, Ser. #17013, New 1947
#4 Cinn. Dial Type Univ. Mill, Ser. #4A4U1H-3, New 1940
(2) 78" Betts Heavy Duty Vert. Boring Mill, Comp. Elecs., 1942, Ser. BR-1C-9 and BE-1C-20
36" Rockford Hydraulic Vert. Slotter, Ser. #47-S1-85, New 1946
#4 Cinn. Hi-Speed Dial Type Vertical Mill, Ser. #8A4V1K-35, New 1941
#4 Cinn. Hi-Speed Dial Type Plain Mill, Ser. #4A4P1L-132, New 1942

16-44 Cinn. Vert. Hydrotel w/Hyd. Duplicating Attach., Ser. #51M788824-8, New 1951
1½ 6-Spindle Cone Auto. Screw Mach. Ser. 3067-8K—1944
16 x 54 Monarch Tool Room Model CW Lathe, Ser. 17468
16" x 54" Lodge & Shipley, Sec. 35524
20" Monarch Model 60 Series, 1952, Comp. Elecs., Coolant Pump, Air Tracer Control, Steady Rest, Center Dist. 20" x 120"
(2) 24 x 72" Lehmann, Seers, 5211, 5213
6" x 72" Monarch Engine Lathe, Model 60, '54
30" x 16' Niles, Ser. 21904
3FU Fastermatic Auto. Turret Lathe
4 FU Fastermatic Auto. Turret Lathe
HP-100 LaPointe, Horizontal Broach, Ser. 52149, Stroke 78", 50-Ton Cap., Comp. Elecs., New in 1952
72" LaPointe Univ. Type Broach Grinder, Ser. 52004, Well Tooled, Comp. Elecs., 1952
No. 5 Warner & Swasey Ram Type Turret Lathe, Ser. 951364, Bar Feed, Presel., Chucks, Tooling, Tmk. Brg., Comp. Elecs., 1950
27" x 84" Lehmann Engine Lathe, Ser. C-261, 1945
#36 Hanchett Rotary Surface Grinder, Ser. 346, 36" Magnetic Chuck, Comp. Elecs.

120th St., Chicago 43, Ill. • PUllman 5-7626

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MOTORS • GENERATORS • TRANSFORMERS
MOTOR GENERATOR SETS • CONTROLS

31 YEARS (1924-55) SERVING INDUSTRY

Buy from one of America's Largest Stocks Engineered and Rebuilt by Specialists

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	Volts D.C.	Volts A.C.
1	2500 (3-unit)	Whse.	720	600	2300
1	1500	Whse.	514	250	4600/2300
1	1000 (3-unit)	Whse.	1200	250	2300
2	500	Whse.	1200	125/250	2300/440
1	500	Ch. Wh.	720	575	2300/440
1	400	Ch. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250/275	2300
3	200	G.E.	900	125/250	2300
1	200	Elliott	1200	125	4000/2300
1	150	G.E.	1200	250/275	2300
1	125	Whse.	1200	250	2200
1	100	Al. Ch.	1200	250	4600/2300
1	100	Ch. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
1	50	G.E.	1200	250	440/220
1	25	Ideal	1750	125	440/220

LARGE MILL TYPE MOTORS

Qu.	HP	Make	Type	Volts	R.P.M.
2	3000	Whse.	Rev.	525	600
6	1500	Whse.	Encl.	525	600
1	1250	G.E.	MCF	600	250/700
6	700	Whse.	Encl.	250	300/700
3	600	Al. Ch.	Mill	600	300/600
1	325	Whse.	Mill	500/800	250/550
1	250/450	Al. Ch.	HCC	250/375	250/1000
1	150	Whse.	Mill	600	380/720

STANDARD DUTY DIRECT CURRENT MOTORS
230-Volt

Qu.	HP	Make	Type	R.P.M.
1	450	Whse.	SK	450/600
1	350	G.E.	CD-169-A	1150
1	200/250	El. Dy.	Size 22	400/1200
1	200	Whse.	SK-201	400/800
2	200	Ch. Wh.	81H	1150
1	180	G.E.	MPC	400
1	150	Whse.	SK-201	380/900
3	125	Whse.	SK-184	575/850
1	125	G.E.	MPC	400/600
1	100	El. Dy.	30-S	450/1350
2	100	El. Dy.	30-S	475/1350
1	80	Rel.	651-T	575/1150
2	50	Whse.	SK-131.5	600/2200
1	40	G.E.	CD-122	500/1600
1	30/40	Rel.	651-T	250/1250
1	25	Whse.	SK	250/1000
1	32½	Whse.	SK-150	400/1200
1	15	G.E.	CD-85	575/2300

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Qu.	HP	Make	P.F.	Volts	R.P.M.
2	2000	G.E.	80	2200	720
1	1750	G.E.	100	2200	3600
1	800	El. Mchy.	80	440	1200
6	350	G.E.	100	2300	900
1	300	G.E.	100	2300	750
1	300	G.E.	100	2300	600
1	250	G.E.	100	2300	514
1	250	G.E.	100	440	450
1	150	G.E.	100	2200	900
2	150	G.E.	80	440/220	720
1	150	G.E.	100	550	600
1	150	G.E.	80	440/220	450
3	135	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
2	100	G.E.	80	440/220	600
1	100	El. Mchy.	100	440/220	360

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3	8333	Al. Ch.	OISC	1	40000/69300-13600/6800
3	3000	Std.	OISC	3	19050/33000-4160
3	2000	G.E.	H	1	26400/13200-4160/2300
3	333	G.E.	H	1	13200-2300/4000
1	300	Whse.	OISC	3	91500-440
2	150	G.E.	HT	3	2400/4160-240/480
3	100	G.E.	H	1	33000-2300
1	100	G.E.	H	1	4160-120/240

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1	1250	G.E.	MT-498	2300	257
1	1200	G.E.	MT	2300	296
2	1000	G.E.	M-575	2300	1185
1	1000	Whse.	CW	2300	440
1	750	G.E.	I-M	2200	400
1	500	Al. Ch.	ANY	2200	505
1	500	G.E.	I-M	2300	450
1	450	Whse.	CW	2200	440
1	400	Al. Ch.	ANY	2200	505
1	400	G.E.	MT-424	2300	352
1	300	Whse.	CW-1032-B	2200	704
1	250	Al. Ch.	ANY	440	705
1	250	G.E.	MT-414	2200	380
2	200	G.E.	I-12-M	2200	575
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ANY	440/220	705
1	150	Whse.	CW	440/220	490
1	150	Whse.	CW	440/220	435
1	104	Whse.	CW	440/220	870
1	100	El. Dy.	EDX	2300	900
1	100	G.E.	MT-558	220/440	790
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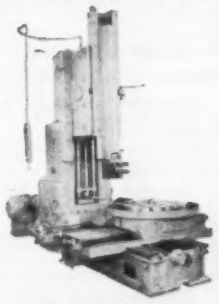

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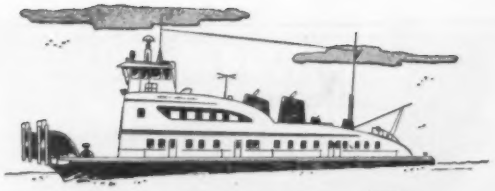

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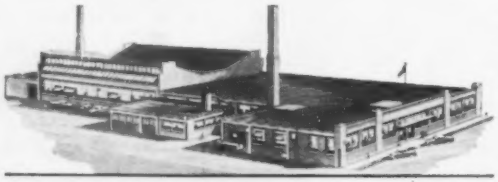

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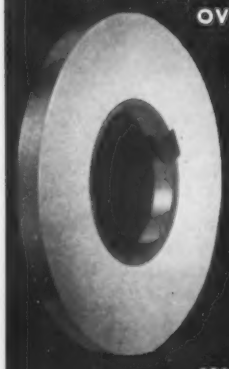

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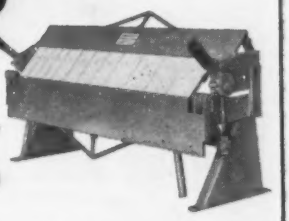

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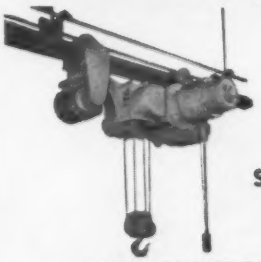

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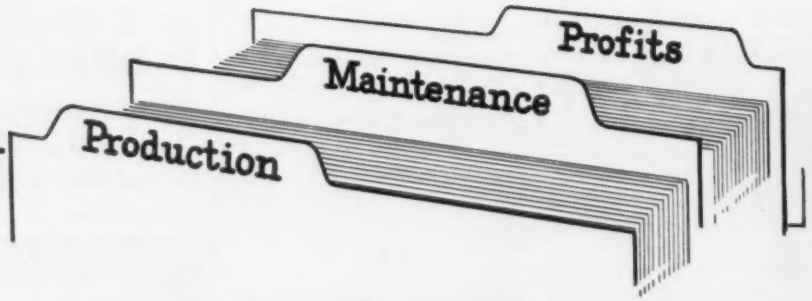

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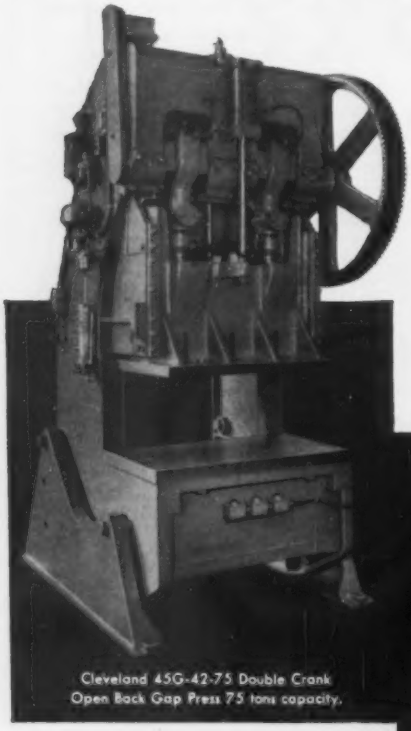

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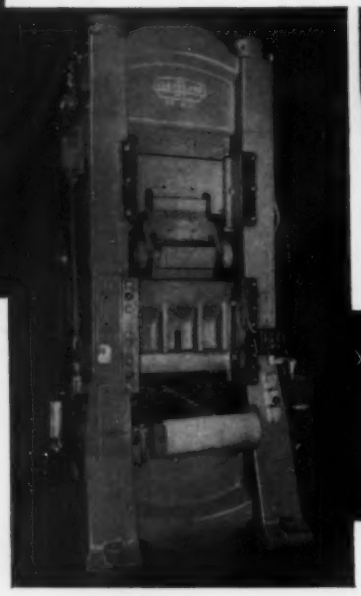

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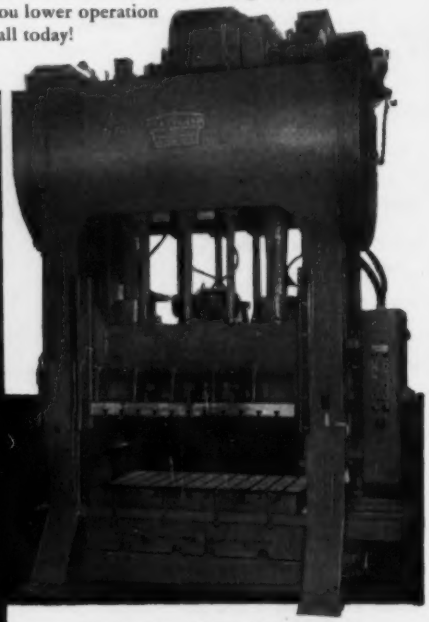

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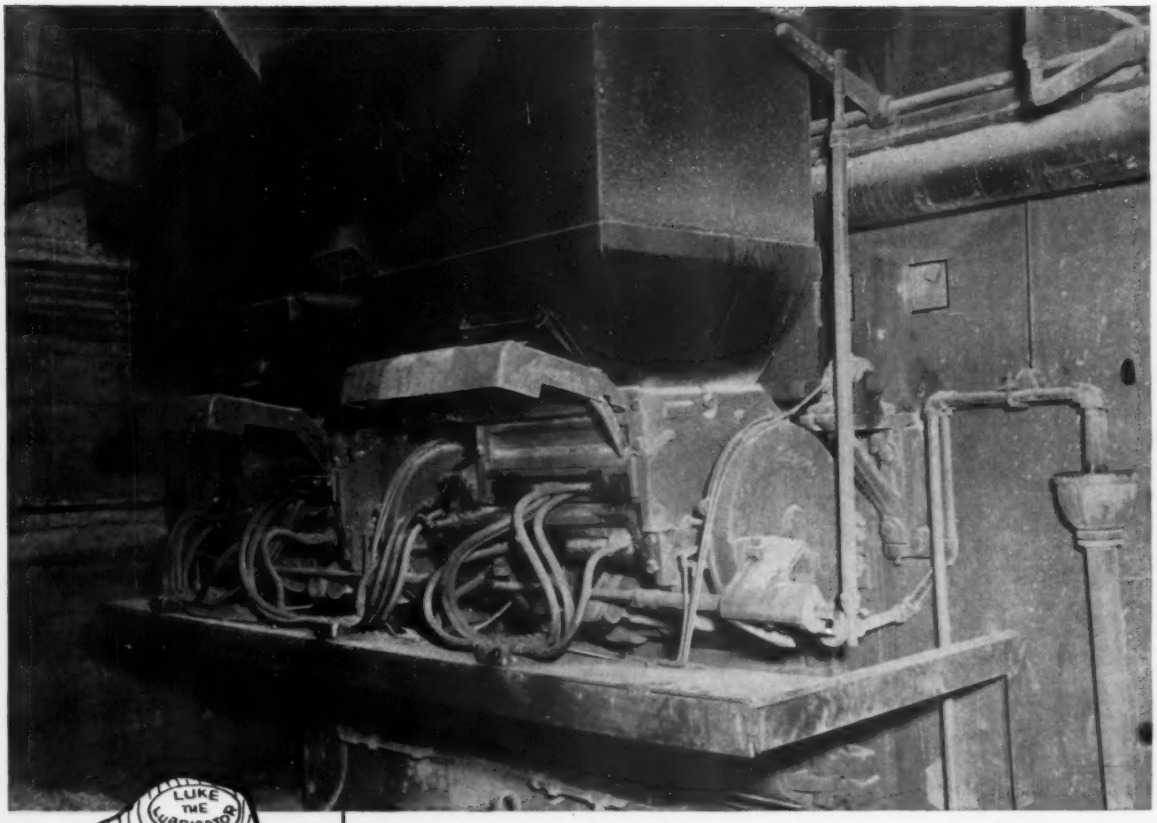

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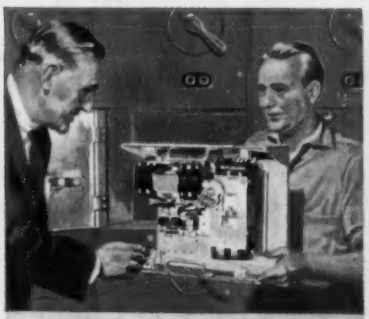

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